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A CLINICAL STUDY ON SARCOMA OF THE TONGUE.

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The pathogenesis of sarcoma, like a large number of other neoplasms, is obscure, if not completely unknown. Cohnheim affirmed that neoplasms recognized as a primary cause an inclusion of fetal elements within the tissues, an inclusion due to a disturbance in the embryonal organization. Should one, instead of this theory, admit Bard's opinion, according to which neoplasms are the product of a special process constituting a kind of monstrosity of the cell development, or, on the other hand, the theory emitted by Jürgens, which considers sarcoma as of a parasite origin? What must be admitted, and the study of reported cases will furnish the proof, is that traumatism certainly plays quite an important rôle in the production of sarcoma. It is no longer doubtful that traumatism, combined with a local predisposition, should be incriminated as one of the causes of sarcoma of the tongue, and from this standpoint bites, bad teeth, roots, and prolonged irritation resulting from the use of tobacco and alcohol should be incriminated. In Dunham's case, it is to be remarked that the patient was an inveterate smoker and that eight months before the operation, following a bite of the tongue, a so-called blister appeared, which did not subside, and being constantly irritated by the contact of diseased teeth became indurated at the end of three months. From this time on it slowly increased in size, until it reached the volume it had at the time of the operation, when it measured one centimeter and a half in diameter.

In Marion's case it is to be observed that the three large upper molars, as well as the first lower molar on the side corresponding to the sarcoma, were completely diseased, and it was on these decayed teeth and roots that the growth moulded itself. Littlewood says

that in his case of lingual sarcoma the growth developed upon an ulceration following a burn of the organ. In Melchoir-Roberts' case it is stated that the lower jaw on the right side presented several roots of teeth, which produced ulceration of the surface of the tumor, while the upper jaw also contained two roots which projected slightly. As to healthy teeth, there were on the right side two small molars and the cuspid above and the four incisors and two molars below. In the case recorded by Franchomme it is stated that at a point in the upper jaw, exactly corresponding to the neoplasm, there were irregular and sharp edges of decayed teeth, and, surmising that the tumor might be due to the chronic irritation of the tongue produced by these fragments, they were removed.

According to certain writers, heredity has been invoked as favoring the development of sarcoma. This cannot be doubted in certain types of tumors, carcinoma in particular, and relative to this subject Broca mentions a family in which, in less than seventy years, sixteen members died from cancer. But, in the case of sarcoma, this is more difficult to demonstrate and I am aware of no authentic case where this could be proven.

Sarcoma of the tongue may occur at any age, but it is quite evident that its frequency attains its maximum at about the age of thirty years.

Congenital sarcoma is excessively rare and Jacobi's case is an example. This was an infant eleven weeks old, in whom the mother had noticed a tumor of the tongue a few hours after birth; the neoplasm slowly increased in size and finally reached the volume of a walnut. The following figures will give a fair idea of the age at which lingual sarcoma is most frequently met with: In fourteen instances the patients were under 30 years of age; in three they were between 30 and 40 years; in four between 40 and 60, and in four they were over 60 years of age. Sarcoma of the tongue appears to have a certain predilection for the masculine sex. Out of twenty-five instances in which the sex is indicated, the disease occurred fourteen times in men and eleven times in females. In this respect it is similar to sarcoma of the bones, which, according to Schwartz, was met with 112 times in the male and seventy-four times in the female.

The seat of sarcoma of the tongue is most variable and it may arise in most any part of the organ. It was found at the base of the tongue in 5 cases, on the dorsum in 6, on the borders in 4 and on

the lower aspect in 4. In 6 cases it was found developing in the midst of the organ.

Usually sarcoma of the tongue takes the form of a rounded growth, whose dimensions have nothing absolute. Varying from the size of a small pea to that of a walnut, or even a hen's egg, it may attain a much more considerable size and invade the entire base of the tongue to such an extent that the epiglottis and vocal cords are rendered invisible by the laryngoscope, and it may even fill the entire buccal cavity, preventing one from seeing the back of the throat. Of course, the size of the growth varies with the time at which the patient consults the surgeon.

In the beginning very small, not larger than the head of a pin, the growth may very rapidly take on a considerable size, which operation alone will allow one to limit.

Its consistency is also very variable. Sometimes it is firm and elastic, while at others it is mixed, that is to say, certain parts of the growth are soft or semisolid, while others are hard.

Practically one can divide sarcoma of the tongue into two varieties, namely, the pedunculated sarcoma and the interstitial sarcoma. The latter arise in the fibrous structures which give insertion to the muscular fibres of the tongue and usually the latter are not involved in the process. In its development the growth is more apt to push them aside and surrounds them in a more or less distinct cellular envelope, a fact which favors the operation of simple enucleation of the neoplasm.

It is this particular variety of sarcoma which makes the diagnosis difficult and there is not a single neoplasm for which it may not be mistaken. I shall soon point out that tuberculous or syphilitic gummata lipomata, fibromata and cysts present the same symptoms and it is impossible by a simple examination to discover any very distinct characteristics. From the standpoint of the prognosis it would appear that this form of sarcoma of the tongue is less malignant, but operative results show that there are many exceptions to this rule. For example, in Scheier's case, it is stated that the tumor was soft, easily enucleated and after removal a deep cavity was left, but in spite of this, a small tumefaction returned five weeks after the operation and developed with such rapidity that at the end of a week the entire floor of the mouth was invaded by a hard growth; generalization was not long in developing and the patient died a few

months after from cachexia. Instead of being distinctly limited, this form of sarcoma may send out prolongations among the normal anatomic structures; the sarcomatous cells little by little infiltrate the muscular tissue, so that it is difficult to discover any precise limits to the morbid tissue.

In the pedunculated variety, the sarcoma arises in the submucous tissues and has a tendency to evolute, not in the muscle of the tongue, but outwardly; that is to say, toward the buccal cavity. It pushes the mucosa covering it forwards, so that the latter finally gives way and forms a kind of calyx on each side of the growth, which develops like a cauliflower. A pedicle unites the neoplasm to the structures of the tongue; it is usually short, rather thin, and may occasionally be distinctly mapped out in the lingual tissues.

In order that an ulcerative process shall develop, the growth must attain a certain size. It is then easy to understand that a time comes when the elements of the mucosa reach their maximum of distension and give way. It should also be added that traumatism also comes into play, caused by bad teeth or by friction with food. The pedunculated type of lingual sarcoma is far less frequent than the former variety.

Like other neoplasms of the tongue, such as lipoma and fibroma, the commencement of sarcoma is absolutely insidious. Following some little accident, such, for example, as biting of the tongue, the patient notices a tiny lump developing, let us say, on the borders of the organ; he gives it no attention, but, on account of the rapid increase in size, he consults a physician. Now, at what exact time did the appearance of the sarcoma take place? This it is impossible to know, and in this respect it differs from perfectly benign growths; the patient has not complained of any trouble in the mouth for a number of years, but usually will tell you that for six months, or even less, the growth has been noticed. In the majority of cases, it is the hindrance produced by the tumor that calls the patient's attention to it. The symptoms caused by the growth naturally vary according to its location on the tongue, and it is quite evident that, if it occupies the anterior aspect of the organ, it will produce tactile and painful sensations, which naturally would be much more marked should the tumor arise on the posterior aspect of the organ. Under the latter circumstances, contact with the dental arches does not exist, and here the first disturbances would

be those of deglutition and respiration when it first appeared. Pain of any severity is not frequent. Contrary to carcinoma and tuberculous ulcerations, sarcoma of the tongue has as a characteristic to be relatively indolent, although some few cases have been accompanied by pain, but, usually, this is more apt to be due to the ulceration of the mucosa.

The size of the growth, which is constantly increasing, causes the symptoms to also become more and more pronounced. Mastication and phonation become difficult, especially if the tip of the tongue is involved. The function of taste may become changed and tactile sense may also be diminished. As to deglutition and respiration, if the tumor occupies the base of the tongue, it is evident that they become disturbed. It should also be pointed out that hemorrhage has been mentioned, but contrary to cancer, the loss of blood is slight, being represented by a few shreds in the saliva, usually resulting from the contact of the growth with the teeth during mastication.

Involvement of the lymphatic nodes has been noted, but it is infrequent and of no great importance, a fact which would appear to uphold the theory that the blood, and not the lymphatics, as in the case of carcinoma, is the principal route of generalization of sarcoma. However, Targett and Scheier's patients presented a large gland in the submaxillary region, but was painless on pressure. In the latter case the growth was removed, but not the glands, but about three months later the lymphnodes on the other side were found also involved. This tumor mass was of such extent that it compressed the trachea on both sides, so that tracheotomy had to be performed, and, after this operation, the masses on each side took on an enormous growth, the patient dying a few months later. From these facts it becomes evident that sarcoma of the tongue may secondarily involve the lymphnodes, but this is the exception, and when it does exist the process is more apt to be an inflammatory one.

As I have already pointed out, sarcoma of the tongue is sometimes interstitial, at others pedunculated. I have considered the symptoms to which it gives rise, and it now merely remains for me to say a few words as to the condition of the lingual mucosa. One of the characteristics of a cancerous growth is its early adhesion to the mucosa of the tongue. In the case of fibromata or lipomata, on the contrary, the mucous membrane does not become connected with the growth, and the same may be said of interstitial sarcoma.

The mucosa can be made to slide over the tumor, and this symptom, difficult to perceive in instances of neoplasms on the dorsum of the tongue, where the muscular structures are united to the deep aspect of the mucosa, is, on the contrary, very easy to detect in cases of sarcoma developing in the inferior aspect of the tongue. Consequently the mucous membrane is not involved; its epithelial covering is regular and the papillæ are distinct. This statement is true when one is dealing with a perfectly interstitial sarcoma, or one giving rise to only a slight projection on the surface of the mucosa, but it is no longer true in instances of pedunculated sarcoma. From its size the growth causes the mucous membrane to burst and an ulcerative process is the result; but a distinctive character of carcinoma and sarcoma is that no change occurs in the makeup of the epithelium and papillæ in the latter. The mucosa which forms, so to speak, a calyx around a sarcomatous tumor presents all the ordinary characters of the normal mucosa of the tongue.

Sarcoma of the tongue, as in the case of sarcomata in general, is composed of embryonal connective tissue in a pure state or undergoing one of the early necessary modifications in order to become adult tissue. Among the numerous varieties that sarcoma may take on, it has been shown that sarcoma of the tongue may affect three types, namely, round-cell sarcoma, spindle-cell sarcoma and sarcoma composed of myeloplaxes. An example of the latter type is given us in the case reported by Heath, the microscopic examination being as follows: The cell elements are met with in two very different aspects. Some are made up of large cells, with a very large nucleus, and do not present any very great cohesion among themselves. They are regularly round or oval or even elongated and present one or several appendages resembling tails. Some are met with in the form of very irregular lamellæ as to borders and surface. The nuclei vary in size, shape and distinctness; often very large, sometimes elongated like the cells, they are found generally single; however, a few cells are found containing two or three. The second variety of cell elements is particularly remarkable on account of the nuclei. These cells are indistinctly limited and form by their ensemble a kind of granular mass, in the midst of which the nuclei are found. These vary in size from that of a red blood cell to a leucocyte. For the most part they are round or oval and become elongated as the stroma becomes more fibrous. In certain

spots the nuclei are so numerous that no internuclear substance can be discovered. It would seem, according to this examination, that the growth was composed both of round cells and of myeloplaxes associated with spindle cells. A very beautiful instance of spindle-cell sarcoma is that recorded by Berger. Stained with hematin and eosin, the sections of the tumor made perpendicularly to the surface of the mucosa gave the following details: Below the level of the mucosa is seen a mass deeply stained violet, representing the muscular bundles cut in various directions, between which exist a few rose-colored lines, which represent the elongated cells, infiltrating the interfascicular connective tissue. The more one advances into the thickness of the tongue, the more these lines become smaller and less frequent, while, when one advances towards the surface, these rose-colored bands spread aside the muscular bundles, becoming united one to each other, so that, when the surface of the organ is reached, nothing but sarcomatous tissue is present. At this point the cells, which have taken a direction so as to pass through the opening in the mucosa with the least space possible, are all parallel among themselves excepting in certain points where there is some irregularity in their arrangement. These cells are pressed together, leaving little space for any intercellular substance. At no point could any connective tissue stroma be found. The cells were greatly elongated and pointed, presenting an elongated nucleus of a vesicular nature, containing a few granulations which did not fix the staining fluid.

And lastly, we have the third-type sarcoma of the tongue, namely, that composed of round cells. The following microscopic characters are usually found in this type of growth: Under the mucosa, whose epithelium is thin, but otherwise normal and with distinct papillæ, one observes the tissue composed of young elements which by their juxtaposition form a large plaque, in which no special arrangement of the anatomic elements can be found. The cells are small, rounded, and so pressed against each other that they are only united by an intercellular tissue that can hardly be recognized. They are composed of a large nucleus, with distinct contours and only a trifling amount of protoplasm without any limiting membrane.

Numerous embryonal vessels are found in this tissue, formed by a simple layer of cells. In the midst of the preparation one may

also find a few bundles of muscle, between which lines of sarcomatous cells extend. In some isolated spots, especially in the neighborhood of the vessels, one may perceive a collection of cells having nuclei more distinctly stained.

To sum up, a round-cell sarcoma is composed of cells united by a small amount of intermediary substance of a soft and amorphous nature, and fed by neoformed vessels. The small round cells are composed of a relatively large nucleus with distinct borders and of protoplasm in small amount not surrounded by any membrane.

Nothing is more delicate than the diagnosis of sarcoma of the tongue, and, as I have already pointed out, there is no tumor, either liquid or solid, that cannot be mistaken for it. At first sight, the diagnosis is quite impossible, and it is only by the process of elimination that it can be made and even, in certain instances, a microscopic examination will destroy the hypothesis. I will now undertake to classify the characters distinctive of tumors which may be encountered in the tongue and, in the first place, let us suppose that the patient presents himself with a lingual neoplasm. What is the nature of this neoplasm? In the first place, let us consider the differential diagnosis between sarcoma and a vascular tumor. The distinctive characters of a circumscribed angioma are quite distinct. A circumscribed aneurysm is in direct relationship with a mucosa of normal color, which covers it, although it is quite distinct from the tumor, but by palpating the latter, pulsation will be distinctly felt, and besides, its size increases during straining, especially when the patient speaks loudly. In the case of angioma the tumor presents a characteristic bright red color, is slowly emptied under pressure of the fingers, only to refill as soon as the pressure is removed, and it is nearly always congenital.

As to the differential diagnosis between sarcoma and cysts of the tongue, it may be said that the latter are found either at the surface or in the thickness of the organ and that they are of various types. The most frequent are serous cysts containing a clear, transparent liquid, and their site of predilection is at the base or at the inferior aspect of the tongue. They are nearly always superficial, rarely included in the tissues of the tongue, while in shape they are rounded and either soft or elastic in consistency. Fluctuation may be perceived, or they may be renitent if they are very superficial and with thin walls. The diagnosis can only be difficult when the

cyst is situated deeply in the tongue, possessed of thick walls and containing a mucuous liquid. But its softness and rounded shape might inspire doubt and lead to an exploratory puncture, after which no incertitude remains.

Fibromata of the tongue are usually located on its dorsal aspect, while the progress and development of this tumor is much slower than that of sarcoma, and in consistency it is harder. As in the case of a fibroma, lipomata have a very slow evolution and, in the majority of cases, the patient has been the possessor of the growth for a number of years when he first comes under the observation of the surgeon. Lipomata are found more frequently on the lower aspect of the tongue and by palpation give the sensation of characteristic softness.

The differential diagnosis of sarcoma with lesions resulting from actinomycosis may be difficult, and in one instance Poncet believed that he was dealing with actinomycosis, when in reality the growth was a spindle-cell sarcoma. The case is of interest and for that reason I will briefly sum it up. In 1880, the patient noticed a sudden tumefaction of the tongue, which soon took on a considerable size. Mastication and phonation became impossible. The tumefaction occupied the left side of the tongue, the organ being pushed to the right and twisted on its axis. An incision was made, which gave issue to a yellowish grumous pus, in no way resembling that found in acute abscess; this pus was fetid. After the incision the symptoms markedly subsided; respiration became free and the day following the operation the patient could both speak and swallow, but the tumefaction of the tongue still remained somewhat and the organ was thrown to the right. Eight years later, the patient, being considerably annoyed by the tumefaction, which had not ceased to increase, presented himself at the hospital. He could not close the mouth, swallowing was very difficult, the respiration greatly hindered and speech almost impossible. When the mouth was open an enormous tumor was seen entirely filling up the buccal cavity. The growth was nothing other than the tongue, considerably increased in size in its middle portion. At no point could any inflammatory or ulcerative lesions be found, but the lingual mucosa formed part of the neoplasm, the latter presenting the consistency of a solid tumor. As to the mucosa of the floor of the mouth, it was found to slide easily over the underlying mass, which projected

upwards. After removal of the growth it was proven to be sarcomatous in nature, but the signs on which Poncet based his diagnosis of actinomycosis were furnished by the order of the accidents, the suppuration, the fetid odor of the pus and the absence of any recurrence.

Lingual actinomycosis is less frequent than other forms of the infection and this infrequency is probably due to the special anatomic conditions of the tongue. Composed by thick and muscular masses, this organ offers a far less favorable soil for the development of the actinomyces than the loose cellular tissue which, in the form of parosteal lays, surrounds, for example, the lower jaw and extends towards the temporal fossa and the muscles of mastication. The infection most usually takes place by minute lesions produced by green wheat and oats which inoculate the germ directly.

The affection makes itself evident by tumefaction and hard, slightly elastic, immovable nodes, varying in number and covered by a healthy mucosa. Sometimes fissures are present. But the distinctive sign of actinomycosis is abscess formation, the contents showing the presence of the characteristic yellow grains. Pain and difficulty in movement of the organ vary from one case to another.

The tongue is the frequent seat of syphilitic lesions, and it is above all in this case that the differential diagnosis is important, because a well-conducted treatment may completely cure the local affection in a short time. Syphilitic tumors of the tongue almost always belong to the tertiary period and, for this reason, are late manifestations of the primary infection. Consequently, the history of the case is of great importance and may furnish excellent presumptive reasons for making the diagnosis. One should carefully note the former existence of an indurated chancre or of secondary accidents, the concomitant development of other syphilitic lesions, such as caries, exostoses, ulcerations of the pharynx, gummatous or visceral growths. The local characters have also their importance. In the case of syphilis the tumor is usually only slightly apparent externally on account of the slight projection that it makes under the mucosa, but, if the tongue is seized between the thumb and index finger, a very hard lump may be felt, whose contours are distinctly detected and which extends often much further than would be supposed by mere inspection of the organ. A gumma is more apt to develop in the center of the tongue and frequently it is multiple. At any rate,

even if the patient denies having had syphilis, it appears only logical to try antisyphilitic treatment, and this should be intense and continued for fifteen or twenty days before operation is decided upon.

In the commencement, tuberculous gummata may be mistaken for a tumor of an entirely different nature, but here, as in the case of syphilis, the history of the case is of real importance. Tuberculosis of the tongue is rarely primary. Without doubt there are instances where a solution of continuity of the mucosa produced by a bite, a prick, or a burn, has been the means of inoculation of tuberculosis, and from this point the affection has extended to the lungs by way of the blood or the lymphatic system; but usually tuberculosis of the tongue is secondary and consequently various organs may be incriminated, such as the lungs, anus, epididymis or cervical lymphnodes.

Tuberculous gummata of the tongue are more prone to develop on the dorsal aspect and in the middle part of the organ and usually they are single. However, there are exceptions to this rule. Spherical, regular and of great resistance, producing neither hindrance nor pain, they singularly simulate a hard neoplasm and, if the patient's antecedents are wanting, aspiration of the growth can alone allow one to make a diagnosis. When ulceration takes place then painful phenomena arise and this characteristic of a tuberculous ulcer is of great importance in making the diagnosis.

Like sarcoma, epithelioma may arise in any part of the tongue, but the latter seems to have a certain predilection for the borders of the organ or portions near the borders. An important diagnostic element is to be found in the age of the patient, and according to statistics sarcoma appears to arise more especially in adolescence, because out of 24 cases where the age of the patient is mentioned, it occurred 14 times in individuals under 30 years of age, 3 times in patients between 30 and 40, 4 times between 40 and 60 and only 3 times in subjects having gone beyond the age of 60 years. On the contrary, epithelioma and carcinoma are most exceptional before the age of 20, and consequently a lingual neoplasm, developing in an individual under 30 years of age, is most likely not of a cancerous nature. But the principal element of diagnosis is to be found in the very early adhesion between the epithelioma and the mucosa. In the case of sarcoma, the former will be found to slide over the surface of the tumor and remain independent of it; if the growth is carcinomatous, the mucosa very soon becomes bound to the

growth, it becomes ulcerated, giving rise to a dirty liquid, which is quite characteristic of this ulcerative process.

I have only been so far considering the interstitial growths found in the tongue, and I would now consider the pedunculated varieties. These are less apt to cause error in diagnosis and in practice one has only two neoplasms which must be considered, namely, carcinoma and papilloma.

In the differential diagnosis of pedunculated sarcoma and carcinoma, the condition of the mucous membrane is a very excellent and distinctive sign. In the case of pedunculated sarcoma the mucosa, although it may have ruptured in certain spots, is not invaded by the morbid tissue and consequently does not form part of the growth. On the other hand, the firm consistency and the spread-out development, the absence of soft granulations giving rise to severe hemorrhage, the absence of enlarged lymphnodes, all these are symptoms which will allow one to differentiate between a sarcomatous and carcinomatous growth. And lastly, even if the tumor is ulcerated, the aspect of the ulceration is characteristic and differs in every respect from the cancroid ulceration whose borders are fixed, more or less undermined and everted, always indurated and a reddish bottom bleeding profusely and easily.

A lingual papilloma, formed by an hypertrophy and neoformation of the normal papillæ of the lingual mucosa, is easily differentiated from sarcoma by its decided villous aspect, its size, which is never considerable, and by its much slower development.

Of lymphadenoma, whose clinical diagnosis is impossible, I have little to say. The site alone might cause one to reflect, for, in point of fact, it is the base of the tongue, in the neighborhood of the tonsils, that this type of neoplasm is most prone to develop. However, to sum up the situation of diagnosis of sarcoma of the tongue, it may be said that it is quite difficult. All neoplasms and particularly fibromata, lipomata, tuberculous or syphilitic gummata may be mistaken for a carcinomatous growth and one can easily understand the unfortunate results which may result from this mistake as far as the future of the patient is concerned. A sure diagnosis in the case of certain types of neoplasm is not always of any great utility. It makes very little difference whether one is dealing with a lipoma, a fibroma, a carcinoma or a sarcoma, because the operative interference is the same. But it is no longer the same if one is

dealing with a syphilitic growth, for example, or the lesions of actinomycosis, because, in these cases, a properly conducted medical treatment will control the situation.

Microscopically there may be cause for hesitation between a carcinomatous and sarcomatous growth, but a careful histologic study will show in the case of the former the presence of various sized squamous epithelial cells grouped in lobes separated from each other by a large meshed stroma. Adherent among themselves the cells form more or less regular masses. The more superficial ones are placed perpendicularly to the stroma and contain a marked nucleus; those that come next are cubic, also possessing an apparent nucleus with a nucleolus. The more interior cells are flattened and fibroid, forming concentrically placed layers, similar to the leaves of a cabbage, surrounding a central and homogeneous portion or containing nuclei and these have been designated as epidemic lobes. The stroma is composed of pure embryonal connective tissue, that is to say, of small round cells and vessels, or of connective tissue. I have here only mentioned the classic squamous cell epithelioma, because this type alone has only been found in the tongue, so far as I am aware.

As I have already pointed out, what characterizes encephaloid sarcoma is the presence of small round cells, quite regular in shape, composed of a relatively large nucleus with distinct contours and of a small amount of protoplasm, contrary to what is found in epithelial cells. These cells are united by a small quantity of soft and amorphous intermediary substance and in such small quantity that the cells are usually almost placed one upon the other. The blood vessels are large, but difficult to isolate on account of the texture of their walls, the latter being also formed of embryonal tissue. Spindle-cell sarcoma, composed of elongated cells, placed regularly beside each other and forming true parallel lines, is less likely to give rise to any diagnostic confusion. An adult fibroma, being usually a circumscribed growth, does not penetrate into the tissues and it is from this fact that this is to be distinguished from embryonal fibromata or sarcomata. For that matter, its histologic make-up is quite typical. Microscopically a fundamental mass of fibrillæ, cellular elements and vessels are to be found. The fundamental substance appears in the form of bundles of fibres interlaced in various directions. Each of these bundles is composed of extremely delicate fibrillæ closely bundled together. The cells are small and rounded,

containing brilliant nuclei, while others are elongated, fusiform or star-shaped. As to the blood vessels, they are more or less numerous and deprived of an adventive layer, a fact which explains the occurrence of severe hemorrhage when the growth has been submitted to a traumatism.

Histologically, then, it is quite an easy matter to distinguish between sarcoma, carcinoma, and fibroma, but this diagnosis becomes more delicate when one is obliged to decide whether the growth is a round-cell sarcoma, a lymphadenoma or granulation tissue. What characterizes a lymphadenoma is the presence of trabeculated tissue imprisoning the cells, but this tissue does not develop completely, as it remains in the embryonal state, so that the diagnosis may be wrought with difficulty. However, no matter how slight this reticulum may be, if it is found the diagnosis of lymphosarcoma should be made.

As to granulation tissue, one is merely dealing with an inflammatory tissue well vascularized. It is composed of a large number of young cells held together by a soft gelatinous fibrinous substance. The cells are round, of small size and contain quite a large nucleus relative to the amount of protoplasm surrounding it. The vessels, with very thin walls and usually arranged in loops, pass through the mass. At first sight this tissue closely resembles sarcomatous tissue, but, however, certain differences exist. Thus, the blood vessels that are found in sarcoma are larger and their walls thicker. This difference would be imperceptible if the arrangement of the cells did not give a very valuable indication as to the diagnosis. A granulation in point of fact, contrary to sarcoma, does not infiltrate the underlying tissues; it remains localized at its starting point and does not send out cell prolongations into the normal structures.

A tuberculous gumma, in its early stages, may also give rise to a diagnostic error. Now, this growth is composed of an agglomeration of miliary granulations, themselves composed of small rounded or slightly flattened cells. Pressed together in certain spots, these cells are separated in linear groups by a brilliant refringent substance, sometimes amorphous, at others irregularly fibrillar. Beside these elements will be found giant cells. Blood vessels in small numbers will be found in the tuberculous granulations, but usually they are occluded, a fact which explains the differences presented by this neoplasm according to the period of its evolution. Little by

little the elements, becoming anemic, are infiltrated with fatty granulations and then they become deformed and atrophied. Later on, the tubercle ceases to live, it forms a dry, caseous mass composed of deformed cells and drops of fat. It then becomes a foreign body to the surrounding structures, irritating them, and an inflammatory process sets up, causing their destruction.

As to syphilitic gummata, they are, from their beginning, composed of small round cells arising around the small vessels and in the vacuolæ of the connective tissue. The trabeculæ circumscribing the vacuolæ are destroyed little by little and the young cells form masses which finally coalesce. The central portion of the gumma, being poorly nourished, is not long in becoming infiltrated with molecular granules, giving it an opaque or yellow aspect, while the peripheral portion, formed by more vivacious elements, little by little is transformed into a definite connective tissue. Soon the slightly vascularized central portion undergoes a mucous or fatty metamorphosis and the gumma melts and becomes a kind of foreign body destined to be eliminated. Consequently, if microscopically a focus of necrosis is found, one may be sure that he is dealing with a syphilitic or tuberculous gumma. Confusion is possible between these two diseases, but syphilomata possess a more abundant connective tissue stroma, especially at the periphery where it forms a kind of shell for the central mass. The cell elements in syphilis are usually larger, better nourished and less atrophied than those found in tuberculosis and an important fact is that in the former giant cells are absent.

There still remains one other cause of diagnostic error; I refer to the neoplastic type of actinomycosis, but, in this case, microscopic examination is usually easy. In point of fact, actinomycosis is characterized by the presence of small yellow grains placed in the substance of the neoplasm. These are about the size of a millet seed and are formed by a central mass from which divergent rays emerge. The central mass consists in an inextricable mass of straight and wavy filaments, representing a true mycelium. The divergent filaments represent elongated swellings and are almost stuck together. This is the result of a change produced in the mycelium by leucocytes.

One of the characters on which the diagnosis of sarcoma may be made is furnished by the progress in the development of the

neoplasm. As is well known, lipomata, fibromata and cysts have a very slow evolution, contrary to sarcoma, whose progress is very rapid; within a few months or even weeks the latter tumor may assume a considerable size, and this tumor, which, in the first place, looks like a simple pimple, takes on such an extension that the patient becomes alarmed. In Jacobi's case the patient, who was eleven weeks old, presented a tumor the size of a walnut in the left half of the tongue. The mother had noticed this growth a few hours after birth, but, at that time, it was so small that it did not prevent the child from nursing. In Butlin's case, the tumor had reached the size of an egg in two months' time and extended from the anterior third of the tongue to its base. In Scheier's case, the tumor reached the size of a hen's egg in six weeks from the time it was first noticed; it included the larger portion of the base of the tongue up to the epiglottis, which it pushed downwards and covered. Marion's patient noticed a small pimple on the left border of the tongue and within two months it attained the size of a walnut. The same may be said of Lichtwig's case, where the tumor reached the same size in about six weeks. Of course, there are exceptions to the rule. Poncet's case took eight years to attain the size of an orange, while that recorded by Mercier only reached the size of a walnut during the course of eight years. But, generally speaking, it may be said that the evolution of lingual sarcoma is very rapid, and this is to be recalled when treatment is considered.

The final outcome of sarcoma of the tongue when left to itself is death. Barker's case resulted fatally from generalization, the patient dying from cachexia. But, when properly dealt with, I believe that the prognosis is not quite so dark as has been upheld in the past by many eminent authorities. In Marion's statistics are to be found five cures and three deaths in patients who have been followed for a considerable length of time. These cures may be considered as positive, because two patients were seen at the end of three and eight years, respectively, without recurrence; two were well after four years and the fifth two years after the operation. Death occurred in three other patients, as follows: One died in six months, and the other two, two years after the interference. To this statistic may be added another case which remained well a year after operation, that of Lichtwig, whose patient showed no signs of recurrence two years after the operation, while in Melchoir-

Robert's case the patient was perfectly well two years and a half after removal of the growth. Consequently, we have eight cures and three deaths.

The relative benign nature of lingual sarcoma was attributed by Melchoir-Robert to the intimate make-up of the growth, and in point of fact, if the microscopic examination of recorded cases is carefully gone over, the following details will be noted: In Heath's case, the cell elements presented two very different aspects. Some were composed of large cells of various sizes, having very large nuclei and presenting no very great cohesion with each other, so that there is no doubt but what Heath was dealing with myeloplaxes. In Godlee's case an exploratory puncture showed the presence of a hard substance in the center of the growth, and introducing artery forceps into the mass, a fragment resembling bone was removed. Now, since a bit of ossiform substance was removed from this growth, it is more than probable that had a careful examination been made myeloplaxes would have been discovered. In Berger's case, the tissue stained with eosin was found studded with very brilliant red points, some isolated, others united in masses. These points, which represented blood cells, were situated where the bundles of spindle cells were spread apart. This spreading was very slight at certain points and here only one or two globules could be seen, but in other portions of the field this spreading was so extensive that true capillary lacunæ were formed.

Here we have three observations, where either myeloplaxes or bone tissue evidently arising from myeloplaxes has been noted with precision; or, on the other hand, blood vessels or blood cells arising in abnormal quantity, which had of necessity been preceded by vasoformative cells, elements very near neighbors to myeloplaxes and often identical with the latter. In Jacobi's case microscopic examination showed that the growth was composed of spindle cells. The peripheral portions contained much muscular tissue and numerous capillaries, but these were in less numbers than in the growth itself. In Dunham and Mercier's cases section of the tumor showed numerous vessels and it is consequently probable that the latter were preceded by large vasoformative cells or numerous myeloplaxes. Without doubt, in any tumor possessed of blood vessels, vasoformative cells must exist some time in the evolution of the growth, but the presence of vessels in large numbers also implies the former

existence of a very large quantity of vasoformative cells, if not myeloplaxes, a circumstance which gives a special character to the growth and has a tendency to liken such tumors to myeloplax neoplasms. As is well known, this variety of sarcoma is generally non-malignant, or rather, I should say, benign, but, at any rate, it is far less serious than the other types, and thus may be explained the particular character and relative non-malignancy of sarcoma of the tongue.

The principal danger of lingual sarcoma, and, for that matter, sarcoma in general, is due to the frequency of recurrences. In instances where a cure was considered as certain, I find that a recurrence occurred four times. In Mandillon's case, the recurrence took place three months after the operation. A few months later a second recurrence and another operation, soon followed by a third recurrence, but since the last operation an apparent cure has been maintained. On July 21, 1885, and July 27, 1886, Mikulicz operated on recurrences of sarcoma for which he had primarily operated in 1884. Perman removed a recurrence of the growth just one month later after the primary operation. Marion's patient had three recurrences; the first occurred exactly one month after the primary operation and the two following about one month after each. Berger was loth to perform a fourth operation and decided to await events; the growth diminished in size and later completely disappeared. In the cases of Butlin, Poncet, Lichtwig and Melchoir-Robert, no recurrence took place.

What may be concluded from these facts? It would seem to me that, when in the presence of a sarcomatous growth of the tongue, there should be no hesitation and proper radical treatment must at once be resorted to in order to limit the evolution of the growth, and if a recurrence arises a free secondary interference may call a halt.

On account of the difficulty of a diagnosis of lingual sarcoma, there is naturally a certain hesitation as to the proper treatment. If the lesion is supposed to be a simple traumatic ulcer, it is well to try certain local applications, but caustics are to be avoided because of their usual irritating action. Where there is any suspicion of lues, an antisyphilitic treatment should be instituted for fifteen or twenty days and its action carefully watched. Coley's serum may be employed, and in some cases with success, and in Perman's case

a successful outcome was derived from the injection of pyoktanin following spontaneous enucleation, but instances of this type are at present still too few in number and in the present state of our knowledge a thorough ablation of the growth is the only rational treatment.

In the lesion with which we are dealing in this paper, a limited operative procedure is more preferable when the total removal of the tongue is not resorted to, but, if the growth is extremely large, it goes without saying that simple extirpation of the former is not possible. In those cases where the neoplasm extends far back into the base of the tongue, preliminary tracheotomy should be done, after which an incision just above the os hyoid is made, the two lingual arteries are ligated and then removal of the growth is done. If necessary, the cheek may be incised and the tongue, drawn forwards, may be liberated in the median line, so that the necessary amount of tissue can be removed.

In cases where the entire base of the tongue is invaded by the neoplasm, it is difficult to determine just how far it extends and buccal extirpation of the organ is practically impossible. In such cases, after a tracheotomy, the skin is incised parallel to the lower border of the maxillary from the angle of the jaw to the anterior border of the masseter, and from this point is carried vertically down to the os hyoid. The lingual artery is then divided between two ligatures. The lower jaw is next sawed through between the first and second large molar in an oblique direction, from above downwards and from behind forwards. Both sections of the jaw being spread apart, the growth can be largely exposed and easily enucleated. After this, the wound is thoroughly cauterized and drained and the skin sutured. I believe that a free incision in the cheek aids greatly in performing the complete operation.

To sum up, the operative treatment of lingual sarcoma will vary greatly from one case to another, and it is evident that if the growth occupies the base of the tongue and is more or less seated in the pharynx, the technique to be employed will not be the same as if it were located in the anterior portion of the organ. What must be avoided, above all, is a tardy operation and, in this point of view, it is well not to continue an antisyphilitic treatment for too long a time in cases of lingual growth whose diagnosis is in suspense. If this treatment does not give any result within a week or two, hesita-

tion is no longer permitted and immediate removal of the neoplasm should be undertaken.

THE RELATION OF UPPER RESPIRATORY OBSTRUCTION TO ORAL DEFORMITY, AND SIMULTANEOUS TREATMENT BY EXPANSION OF THE DENTAL ARCH.

BY FRANCIS ASHLEY FAUGHT, M.D., D.D.S., PHILADELPHIA, PA. READ BEFORE THE SECTION ON STOMATOLOGY, AMERICAN MEDICAL ASSOCIATION, AT ATLANTIC CITY, N. J., JUNE, 1907, AND PUBLISHED BY COURTESY OF THE JOURNAL OF THE ASSOCIATION.

It is with some hesitation that I undertake a consideration of the topic before the foremost medical and surgical body in the land. If the presentation develops valuable discussion, however, to the end that more definite conclusions may be reached, I shall feel that in accepting your committee's invitation to read a paper, I have done what every student should be willing to do, namely, to add my contribution to the interest and possibly to the help of others.

On consulting the literature on this subject as it has appeared in the journals and in the proceedings of societies, from time to time, I became impressed with the fact that I had undertaken a task which might well stagger the bravest.

More than fifteen years ago someone suggested that dental irregularity might, in some instances, be due to interference in upper respiratory breathing, which results in mouth breathing. This thought formed the basis of an able and complete article by William A. Mills before this section of the American Medical Association.

The earliest reference to this point which I have, advocating the obstructive factor in the production of dental irregularity, appeared in 1892, in a paper by Norman W. Kingsley, where he cites cases in which he performed adenectomy prior to correction of irregularities of the teeth.

Following this, in 1893, A. W. Harlan suggested that all obstructive and chronic catarrhal conditions of the nose and nasopharynx might be contributing causes of dental irregularity, and in his practice, at this time, advised their preliminary treatment or removal.

The suggestions have been accepted, applied in the course of practice and the soundness of the doctrine abundantly proven by many practitioners since that time, until now it is natural for the orthodontist to enlist the services of the rhinologist in the treatment of dental irregularity complicated by upper respiratory obstruction. Nevertheless, a few have taken exception to this theory and have suggested the activity of other factors in the production of certain varieties of oral deformity.

In 1891, Wendell Phillips considered heredity to be the chief determining factor in the production of dental irregularity, and stated that, in his experience, the effect of enlarged tonsils and adenoids in the production of irregularities of the teeth is slight, unless the growths are so large as to cause complete obstruction.

In 1895, E. S. Talbot expressed the opinion that: "Every case of adenoid growth will be found to be a case of degeneracy as shown by the want of development of the bones of the face and jaws." In the same year George F. Eames stated his belief that mouth breathing does not cause irregularities of the teeth. In 1901 C. S. Butler stated that he has often found irregularities of the dental arches and adenoids coincident but not interdependent.

At about this time the possibility of improving the intranasal condition, through corrective measures applied to the teeth and dental arches, was suggested. In a paper by Nelson W. Black are reported cases in which satisfactory relief was obtained by expanding the maxilla in its lateral diameter. By this treatment the distorting force, which was the cause of the deflected septum, was supposed to have been relieved, the septum was allowed to grow straight, and the need for intranasal manipulation rendered unnecessary.

Two years later W. Pfaff, in a paper read before the fourth International Dental Congress at St. Louis, August, 1904, concluded, after the examination of 2,000 skulls and 1,320 patients, that stenosis of the nasal cavity is practically always caused by contraction of the palate and abnormal position of the teeth. For both prevention and treatment of the intranasal condition he also advocated lateral expansion of the maxilla—conclusions which appear to be devoid of any value whatever.

Further references are unnecessary to show that there is now, as there always has been, marked diversity of opinion on what is practically the key to the whole situation—the relation of upper

respiratory obstruction and mouth breathing to irregularities of the teeth and jaws.

Throughout the papers consulted, there runs a constant current of uncertainty, which frequently results in doubtful if not erroneous statements. These include surprising contradictions in the matter of etiology and diagnosis, some of which have been enumerated. Diverse methods of treatment are advocated without apparent regard for the fundamentals involved or the result desired. Thus in one instance we find adenoids and irregularity of the nasal septum referred to as one condition with a common method of treatment.

These and a host of minor errors and uncertainties led me to formulate a series of questions designed to cover at least a few of the chief points of contention. Accordingly a set of questions, together with a letter requesting personal experience in the study and treatment of these conditions, were sent to a number of orthodontists.

The replies have been very gratifying, the answers, with few exceptions, being fully and carefully prepared, showing a desire on the part of the writers to aid in solving some of these vexing problems. The answers are of extreme practical interest because they represent simultaneous reflection of the present trend of thought toward the study of the interrelation of nasal stenosis and the contracted high arch deformity.

To quote in detail the numerous valuable points contained in many of these replies would far exceed the space at my disposal. I shall confine myself, therefore, to the merest outline, giving briefly a few important references, together with some of the conclusions derived from an analytic study of the series of answers.

The first result of this investigation, if it may so be called, has been to prove that but little advance has been made toward developing any very definite principles to serve as a working basis in the treatment of these conditions since the subject first attracted general attention. The general leaning seems still to be in favor of the obstructive origin of the contracted arch deformity, through the activity of the process of mouth breathing, and the resulting alterations in muscular antagonism and modifications in atmospheric pressure. In keeping with this belief, about 50 per cent recommend preliminary or coincident surgical treatment of the obstructive condition as a prerequisite of successful orthodontia.

In answer to the question relative to the age at which it is most desirable to perform this operation, 75 per cent of the correspondents chose a time between the fifth and seventh years, while the remaining 25 per cent were willing to wait until early adolescence. In spite of this marked preference, we find that circumstances alter cases and that the extremes of age in which successful operation has been accomplished lie between three years and one month and forty-five years. The general average is approximately sixteen years.

Bearing on the interrelation of the high contracted arch deformity and respiratory obstruction, 73 per cent of operators have found coincident nasal obstruction in at least two-thirds of the cases, while 37 per cent believe it to be practically constant when properly looked for.

Of particular interest are the answers to the questions bearing on the effect of the expansion operation in the presence of upper respiratory obstruction. Only two correspondents express doubt as to the beneficial effect of such methods on the respiratory capacity of the nasal chambers, unless the operation produces definite separation of the two halves of the maxilla. That this definite separation of the two halves is rarely accomplished is amply shown by the summary of replies bearing on this point. Fifty per cent of the orthodontists answering do not produce this separation because they deem it unnecessary to the attainment of satisfactory results; 33 per cent produce such a change only in exceptional cases, while from the replies of the remaining 16 per cent no definite conclusions could be drawn. In spite of this, the majority believe that they have no difficulty in causing separation of the two halves of the maxilla without causing increase in the interproximal space.

I believe such a result to be both anatomically and mechanically impossible. We may liken the palate and alveolar processes to a plane surrounded on three sides by a ridge through which passes the intermaxillary suture, dividing it into two parts. It will readily be seen that it is impossible to cause separation in the two halves of the plane without carrying laterally the ridge, resulting in separation in the median line at a point corresponding to the space between the central incisors. Any attempt to depress the center or

to elevate the sides of the plane must result in some separation in the alveolar ridge.

It seems necessary, then, in order actually to increase the nasal capacity, by lateral movement of the two halves of the maxilla, to cause evident and permanent increase of space between the central incisors. Any operation designed mechanically to increase the width of the nasal chambers, which does not show this separation, must of necessity fail to attain the desired result.

In the answers to the questions relative to the coincidence of respiratory obstruction and oral deformity, 50 per cent have found this coexistence in at least 75 per cent of cases, while 65 per cent have found it in more than 30.

The majority believe adenoids to be the offending condition in at least 75 per cent of cases presenting interference in nasal respiration, with irregularities of the septum, turbinal enlargement and polypi in this order of frequency. These findings are practically in accord with the experience of rhinologists under similar circumstances.

Contracted arch deformity occurs as a result of a variety of obstructive lesions. These differ markedly both in character and location, the most common being adenoid vegetations of the vault of the nasopharynx. This lesion practically never involves the nasal chambers proper.

In the presence of uncomplicated adenoids, any attempt to ameliorate the obstructive symptoms is destined to failure, because such treatment can in no way affect the growths themselves or their containing chambers; and also because any prosthetic result obtained in the correction of the oral deformity, without preliminary removal of the adenoid mass, is likely to be lost by return to the original deformed condition, through the continued activity of the distorting force after the restraint of the corrective appliance is removed.

The treatment of the contracted high arch deformity, in the presence of demonstrable adenoid enlargement, should always be preceded by adenectomy. In the presence of other complicating deformity within the nasal chambers, these should also receive appropriate preliminary treatment.

In considering the effect of expansion methods on deviations of the nasal septum, it does not seem to be definitely recognized that these are really irregularities of only a part of this structure. They usually involve only the cartilaginous portion, and even when the

bony part is included in the deflection, this rarely extends throughout the entire width of the bone. This fact has an important bearing on the success of this operation, as advocated by a number of practitioners at this time.

Septal irregularities have been classified in a great variety of ways. For convenience they may be considered as either simple or complicated: Simple, when they occur without appreciable thickening of the tissues; complicated when they combine the conditions of deflection and thickening, amounting at times to spur formation of the convex side.

Expansion is believed by many to lower the floor of the nose, and, in so doing, to relieve pressure and exert a downward tractive force on the deflected septum. In view of the above facts, it seems almost unnecessary to state that, even if the direction of such a force were possible, it would be effective only in the rare event of a simple complete deflection. For if a part of the septum be already straight, as it usually is, this will effectually resist any straightening force which might reach it through the alveolar and palate processes.

In the light of these facts we must conclude that the field of applicability of a method simultaneously to correct the oral and nasal condition is extremely limited, since we must exclude the two most frequent and important causes of upper respiratory obstruction: Adenoids and deviations of the septum (90 per cent).

It must be conceded then, that, in the majority of cases, if not in all, it is useless to argue in favor of any such method unless the definite aim of the operator is to produce separation of the two halves of the maxilla, thereby causing distinct outward movement of the outer walls of the nares and consequent increase in respiratory capacity, irrespective of the origin of the obstructive difficulty.

To accomplish this movement definitely and successfully, it would seem that the expansion arch is entirely inadequate. This arch, as ordinarily used, implies a movable attachment to the teeth. This must necessarily allow the force to be largely expended on the crowns of the teeth, which will be moved outward as the bone is gradually absorbed from one side and deposited on the other; the apices remaining stationary or even moving in the opposite direction.

Overcoming in a great measure this difficulty in the control of the expanding force is the split-plate or the plate with jack-screw

attachments. These appliances make pressure more definite and apply it over a larger area of tissue, so that the bones will move as a whole, if they move at all. The chief requirement of success in this operation is youth of the patient. With these appliances, undoubted and marked relief from diminished respiratory capacity may easily be obtained, but it must be remembered that such a result is obtained only at the expense of permanent separation between the upper central incisors. Such separation may be reduced or entirely overcome in the eruption of the permanent teeth. This operation is most successfully performed as soon as the existence of the contraction is noted, and is best done at or about the fifth year. Subsequent to the seventh year, as the bones become more fully developed and the suture more firmly united, the possibility of accomplishing this separation will gradually diminish until it becomes impossible through the complete development of the intermaxillary suture. To render this change permanent, existing postnasal obstruction should be removed.

To close this consideration of the subject at this juncture would undoubtedly leave the erroneous impression that most efforts to influence upper respiratory obstruction and mouth breathing favorably, through corrective measures applied to the teeth and dental arches, are of little if any value. This would be the logical conclusion if the process were a purely mechanical one. On the contrary, we are dealing with vital tissues, possessing each a special function and capable of growth, repair and atrophy.

Space will admit only a brief mention of these factors and their relation to the problem of lateral expansion. It is a well-known physiologic fact that one of the most powerful stimuli to the proper development and normal function of any tissue or part is the exercise of the specific function for which that tissue or part is intended. Conversely, the inability properly to perform this function invariably results in either imperfect development or wasting and atrophy.

It is natural, then, that we should find various alterations in the structure of parts of the whole upper respiratory tract. Thus may we account for the effect of adenoids, malocclusion, short-lip and tonsillar hypertrophy on normal nasal respiration and the production of the inevitable train of disturbances accompanying imperfect development of the bones of the face, particularly the maxilla and those forming the nasal passages.

This also explains why the removal of exciting causes and the correction of existing deformities of contiguous parts gradually brings about a resumption of growth in these tissues, resulting in the production of normal nasal chambers and the return of normal nasal respiration.

Possibly of equal importance in contributing to improvement after most corrective measures, is cell stimulation and renewed growth in the maxillary bones, through the irritation caused by the varying degrees of pressure applied to the teeth and alveolar arches. The extent to which this process may be operative is a matter not easily determined, and how far these two factors influence the conditions in a given case to the exclusion of others, we are, as yet, unable to determine, since up to the present time no practical or sufficiently accurate methods of observing and recording these changes have been devised.

Without doubt, many of the results which have been attributed solely to the effect of definite movement of bone, and the resulting improvement in the respiratory capacity of the nasal chambers, are in reality instances of the beneficial results of stimulation of these vital functions.

From my study of the subject a few points have particularly impressed themselves on my mind:

1. The etiology of the general subject of dental irregularity, and particularly the interrelation of such deformity and chronic respiratory disturbances, is still lacking a definite basis. This matter should receive particular attention at the hands of every orthodontist.

2. Dental irregularity in the vast majority of instances is associated with, if not dependent on, upper respiratory obstruction.

3. Dental practitioners, and particularly orthodontists, should be more familiar with the common forms of upper respiratory obstruction, their symptoms, diagnosis and treatment.

4. The comparative study of the changes brought about through corrective procedures should be more carefully studied, and more accurate methods of measuring and recording them devised.

5. The rational treatment of dental irregularity should include preliminary examination and treatment of the nasal chambers and pharynx.

6. The result of the ordinary expansion operation on nasal con-

ditions is more dependent on vital tissue in the nasal region than on mere mechanical movement.

7. Operations designed mechanically to increase the respiratory capacity of the nasal passages are practically valueless unless the intermaxillary suture is separated, as shown by increase of space between the central incisors.

8. It is impossible to relieve stenosis due to adenoids or septal irregularities by expansion methods.

9. Adenoids and deviations of the septum should receive the usual treatment at the hands of the rhinologists prior to the correction of dental irregularity.

10. The stimulation of vital forces and renewed growth in the nasal chambers, together with the restoration of normal conditions in contiguous parts, are the chief causes of improvement following the expansion operation.

ANESTHESIA IN DENTISTRY.

BY ROBERT WAKEFIELD, D.D.S., CRAWFORD, N. J.

A great many among our number neither extract teeth nor use anesthetics. The first is not considered a high class operation, not ethical in fact, and the second is dangerous. Even though a man be a specialist, he should be capable of performing any ordinary operation in dentistry, and certainly should be capable of administering an anesthetic.

Our anesthetics are divided into two classes, "local" and "general." Some agents, notably ethyl chlorid, enter into both classes. Cocain hydrochlorid, beta eucain, stovain and ethyl chlorid are the principal local anesthetics in use at the present time.

Cocain is used in 1 to 2 per cent solution, combined with antiseptics and stimulants, e. g., boric acid, strychnin sulphate and nitroglycerin.

Eucain B. is used in solutions of 2 to 4 per cent. Stovain we have found to work well in 1 per cent solutions.

The eucain and stovain solutions possess an advantage over cocain, in that they can be sterilized by heat up to 250 degrees F. without decomposition taking place.

The gum tissue should be rendered as near aseptic as possible before injecting. This may be accomplished in various ways, and

a solution of mercuric iodid combined with sodium bicarbonate 1 to 5000 answers the purpose nicely.

The injection should be continued until the tissue presents a uniform blanched appearance. It is advisable to wait from one to two minutes before operating.

Ethyl chlorid is very useful in abscessed conditions where it is deemed advisable to inject, and should be sprayed upon the affected part until it presents a frosted appearance, when the operating should be done immediately.

The general anesthetics in use by the dentist to-day are nitrous oxid alone and in combination with oxygen. Ethyl chlorid alone and in combination with methyl chlorid and ethyl bromid, commercially known as somnoform. Ether alone and in combination with alcohol and chloroform and chloroform alone. Nitrous oxid alone and in combination with oxygen is certainly safe.

The objections to its use are the difficulty of inducing anesthesia in some cases and its short duration. The duration in favorable cases can be indefinitely prolonged by the use of the nasal inhaler. This is especially indicated in cavity preparation, lancing abscesses, removal of pulps, etc.

Ethyl chlorid and somnoform induce anesthesia speedily, generally from 15 to 45 seconds, and the available time for operating is 50 to 80 seconds.

I prefer to use the capsules containing 5 c.c. in a Stark inhaler.

It is possible by means of a suitable inhaler, whereby air may be admitted in definite proportions, to prolong the anesthetic stage at will, but for long and very severe operations within the mouth I prefer the ethyl chlorid-somnoform-ether sequence.

Anesthesia is quietly and quickly induced by this method, four to six minutes sufficing in most cases. The stage of excitement, which in a muscular man means something in the line of exercise for the attendants, is entirely abolished. Recovery is very rapid and nausea is rarely felt. I have yet to witness one case following the somnoform-ether sequence.

Chloroform, according to statistics, is far too dangerous a drug to be administered in the dental office. Some patients, however, take it readily, and appear immune to any ill effects. It is rapid in its effect, and its anesthesia leaves nothing to be desired. It must

be some relation to lightning, for it is impossible to tell where it is going to strike next. Squibbs' preparation I consider the best. Every anesthetist should be prepared for any emergency that may arise, and no office can be deemed complete where strychnin sulphate, nitroglycerin, amyl nitrite, adrenalin, aromatic spirits of ammonia, brandy and whiskey are not in the medicine cabinet.

FALSE STATEMENTS CONCERNING CAUSES OF ORAL PATHOLOGY.

BY S. BLAIR LUCKIE, D.D.S., CHESTER, PA. READ BEFORE THE SECTION ON STOMATOLOGY, AMERICAN MEDICAL ASSOCIATION, AT ATLANTIC CITY, N. J., JUNE, 1907, AND PUBLISHED BY COURTESY OF THE JOURNAL OF THE ASSOCIATION.

To state a cause of a diseased condition, without the conclusion being formulated by logical reasoning, which should always accompany clinical inquiry, is misleading. When such a statement appears in a journal devoted to scientific thought it is likely to be accepted as authority, especially if the statement emanates from one supposed to have made a study of the etiology of disease within the region referred to in the opinion expressed.

Ability to recognize causes and defend the part they take in producing effects is proportional to knowledge acquired by study and observation. The process of reasoning is the distinguishing of truth from falsehood, the deducing from evidence an understanding of a proposition. To express with exactness is to comprehend in its fulness.

A pathologic condition is an effect; a comprehension of its causes is a result of an appreciation of phenomena associated with the region affected. Pathology has its basis in physiology and physiology its foundation in anatomy. To comprehend the anatomy of the animal machine we must take it apart, analyze it, and recognize the construction of the parts by the harmony of their association. All those agents or influences capable of deranging either directly or indirectly the structure or functions of the machine are causes of pathologic conditions, and their study as producers of such is technically known as etiology. In the pursuit of the study it is essential, in order to appreciate the influences that operate to weaken or alter structural arrangement and prevent normal function, to

have in mind the construction and function of the machine in health.

To assume a cause may be necessary in the absence of sufficient knowledge to immediately express a decision, and is legitimate in pursuing the investigation into that which is obscure. The assumption then is a working hypothesis and should be supported by demonstrated facts associated with something analogous to that under discussion. In the realm of abstract thought a discussion may thus be conducted and an opinion formed whereby one may be guided in his action. In diagnosing and the pursuit of knowledge as to causes of disease the unknown may become more intelligently understood by such a course of reasoning.

The hearsay of the ignorant may be proven when submitted to analysis. To say an inflamed dental pulp is a cause of pain in the ear may be assumed, but it requires a familiarity of the distribution of the fifth pair of nerves, the indeterminate character of impulses conveyed to the brain, which are so often symptomatic of pulpitis, and the finding of an inflamed pulp to warrant an opinion and institute treatment.

A Presumptive Statement. In *The Journal of the American Medical Association,* May 19, 1906, page 1516, appears this sentence: "The practice of dentists of covering teeth with crowns of metal is one of the most frequent causes of sinus affection." This sentence is a part of an article on "The Nasal Accessory Sinuses" by Emil Mayer, M.D., Adjunct Attending Laryngologist to Mount Sinai Hospital, Chief of Clinic, Ear and Throat Department of the Mount Sinai Hospital Dispensary, New York, read before the Metropolitan Medical Society, New York City, March 27, 1906, and is to be found in the division of the article, "Etiology of Sinus Affection."

It is a regret that no published discussion of the article followed, as it would have been of interest to learn the impression such a condemnation of a useful, comfort-giving prosthetic treatment had on the hearers.

Is this statement worthy to be discussed before this section? No; so far as the intelligent understanding of sinus affections and the rôle diseased teeth take in producing it are appreciated by those in attendance. If there were no other reasons, we might smile and let it pass. But what impression has it made on the minds of those

wishing enlightenment on the etiology of sinus affections who are not familiar with the worth the practice of stomatology has won in benefiting human kind? This and the reflection it has on our prosthetic treatment are the most vital reasons for presenting a rebuttal to such presumption.

The covering of teeth with metal crowns a cause of sinus affection! How? What kind of metal, gold or platinum, as each is used? Porcelain does not appear to have such an effect, in the opinion of the writer of the paper, though many roots are more frequently crowned with porcelain than with metal by the ethically-inclined practitioner, and often crowns of teeth with defective enamel are covered with porcelain. But it is a crown of metal we are to deal with, though it is not specified whether as a cause it is direct or indirect.

Presuming, as a working hypothesis, that a metal covering is a cause of sinus affection, how can it by logical reasoning be demonstrated? Perhaps the roots of a superior molar were found to extend into a sinus that was in an empyematous condition, a glance into the mouth revealing said molar covered with metal. Eureka! It is the metal covering causing the trouble. One is reminded of a student who accompanied his preceptor on the visitation of patients and was impressed with the keen observation and logic of the experienced doctor when a patient was told, without any apparent information being given, that he should not again eat oysters during his indisposition. The student being somewhat perplexed as to how the knowledge was obtained, on leaving the sickroom asked how it was known that the bivalves had been indulged in, and received the reply: "I saw the shells under the bed." On a subsequent day the student was sent to see and report the condition of the sick one, and returned with the startling information that the patient had eaten a horse, as there was a saddle and bridle under the bed.

Anatomic Relationship. In reviewing the relation of the teeth to the maxillary sinus we are reminded that the floor of the sinus is situated over the superior molar and bicuspid teeth and may descend between their roots; it is lined with a mucoperiosteum covered with ciliated epithelium, and the bone forming it is cancellous in character. The roots of the superior teeth are situated within the cancellous portion of the maxillary bone and often extend so far upward as to form the uneven outline on the floor of the antrum. The wall

between the apices of the teeth and sinus is in some cases exceedingly thin, and in rare cases is absent, leaving only the mucoperiosteum covering over the end of the roots as they extend into the antrum.

A tooth consists of a pulp, dentin, enamel and pericemental membrane. The pulp is the formative organ of the dentin and, after that function is fulfilled, is the medium of furnishing nutriment to that tissue. It is situated within a chamber in the central portion of the tooth, and in shape somewhat resembles the tooth to which it is related. It is formed of loose connective tissue and cells, blood vessels and nerves, the last two entering the organ at the apex of the tooth.*

The dentin is a hard, transparent substance composed of an organic matrix impregnated with calcareous salts; through this matrix radiate tubuli from the central cavity containing a soft fibril, which take their origin from the cells of the pulp next to the dentin.

The enamel is a hard substance investing the crown portion of the tooth. It is the hardest tissue found in the animal body, is low in organic constituents, and may be said to be a coat of mail for the protection of the tooth. The cementum in the human tooth is an investment for the root and resembles bone in histologic character, and it is covered with the pericemental membrane which unites the root with its alveolus.

Pathologic Consideration of the Teeth.—The pulp and the condition of the pulp chamber are of importance in considering the treatment of the teeth, whether it be for the simple operation of filling for the arrest of caries, the placing of an artificial crown on a root, or covering the dentin with metal or porcelain as a substitute for the coat of mail.

If by a blow or the encroachment of caries of the dentin the vital force of the pulp is so reduced that it succumbs and gives up its life, fermentation and putrefaction, with the concomitant phenomena that obtain after death in tissue of like endowment, follow.

The process is an analytic one, taking place through the agency of microorganisms terminating in the production of poisonous pto-

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[*Authorities disagree as to whether or not the blood vessels and nerves supplying the dental pulp enter at the apex of the tooth.—Editor DENTAL DIGEST.]

mains, and if no interference is prescribed the pericemental membrane becomes inflamed, pus is formed and a pathologic condition known as alveolar abscess is presented.

During the progressive stages more or less of the poisonous products are absorbed by the dentin and cancellated bony structure, and perhaps the mucoperiosteum of the floor of the antrum becomes affected should the apices of the roots of the affected tooth extend close or into the sinus.

Malpractice.—If a tooth containing a devitalized pulp be filled or crowned without converting the poisonous mass within the pulp chamber into non-poisonous and harmless matter, the removal of the same and the filling of the chamber to the apical foramen, the diseased condition will not be abated but aggravated, and a condition established more severe and dangerous than the former. Such practice, however, is not dentistry, and he who resorts to such methods is unworthy of being called a dentist. The placing of the filling or crown is an act of ignorance or indifference to the necessity of a return to normality before substituting an artificial part, and is as wrong as to charge a syringe with water impregnated with cadaverin and putrescin and inject it into the tissues. The practice of covering teeth with metal crowns during a condition that is possible to pass into a pathologic one of greater magnitude is as deserving of condemnation as the removal of the vermiform appendix without preparing the field of operation, and proceeding with the operation with indifference to antiseptic and aseptic methods, or the placing of an artificial limb on a gangrenous stump and expecting the limb to perform its function with comfort and without interference to the process of repair.

Other Statements False in Their Application to Dentistry.—Dentistry has often been brought in contact with statements from general practitioners of medicine that are reflections on the science and art that constitute it. The devitalizing of pulps with arsenic trioxid, the use of amalgam for filling cavities produced by caries, have been condemned without reasoning or obtaining data from those learned in pathology of the teeth and other tissues of the oral cavity and the therapeutic properties of drugs and material employed in treating diseases which are within the province of dental practice.

We have heard of late that the substituting of lost teeth by a bridge is a menace to the health of the individual wearing such.

With but a limited knowledge of oral prophylaxis one can observe that many bridges and crowns worn in the mouth should be relegated to the scrap pile and the patient be the better for it. It can also be observed that bridge work and crowns placed in the mouth after proper preparation of the tissue they rest on are helpful adjuncts in maintaining hygienic oral conditions, and instead of being a menace to the general health, are giving useful assistance in aiding digestion and promoting health. To thousands of individuals who would be obliged to relinquish social and professional duties "they are lengthening out the enjoyable period of human existence."

Discrimination.—Let there be a discrimination between true surgery of the teeth and their associated parts, that appreciates and comprehends the antiseptic and aseptic treatment that antedates and accompanies the art of repair, and the commercial practice that passes by those fundamentals. We are specialists and our work approximates the work of other specialists, that of the laryngologist and rhinologist, in no small degree, and all who would familiarize themselves with their own specialties should appreciate that of others and work in unison and diffuse knowledge that will be helpful. Insinuation and false statements but divert the sympathetic harmony, while unity of thought and study will divide the ethical from the commercial in all.

TANNIC ACID FOR PAIN IN PYORRHEA.—Max Kner, in the *Wiener Med. Presse,* states that he has often noticed, in pyorrhea alveolaris, pains similar to neuralgia, or rheumatism, attacking one or more teeth, and resisting all attempts at relief. The patient frequently clamors for the removal of the tooth. Kner, in such cases, uses concentrated alcoholic solution of tannic acid:

℞. Acidi Tannici .....gr. xxx.
Sp. Vini Rect. .....f. ℥ijss.

With this solution he bathes, by means of a swab of absorbent cotton soaked therein, the whole of the side affected along the border of the gums, and then allows the patient to repeat this procedure if the pains return. After this bathing, the pain quite disappears, and the pyorrhea clears more quickly and easily under the influence of tannic acid than with silver nitrate and other means, while loose teeth are tightened in their sockets.—*British Dental Journal.*

Digests.

ACID AUTOINTOXICATION AND SYSTEMIC DISEASE THE CAUSE OF EROSION AND ABRASION. By Eugene S. Talbot, M.S., D.D.S., M.D., LL.D., Chicago, Ill. The prevailing opinion has been, and it is taught to-day, that the causes of diseases of the mouth, jaws and teeth are of local origin. Peculiarly is this true of erosion and abrasion, judging from the literature. It has been my purpose in life to devote my time to researches in order to disabuse the minds of the profession of this dormant notion. While it is possible that one or more local factors may enter into the etiology, yet the great factor in all cases of dental pathology is constitutional rather than local. In this paper I shall furnish another proof of these assertions.

No one factor, either local or constitutional, can be accepted as the cause of a given disease. Thus, tooth decay is due to lactic acid ferment; the great cause, however, is evolution and degeneration.

Outside of the etiology of tooth decay, perhaps no subject has caused so much anxiety to the members of the profession as that of erosion and abrasion. The two terms were used by early writers to designate the destruction of the tooth or teeth, erosion being a gradual wearing away of the grinding surfaces of the teeth in connection with the mucous membrane of the mouth. The two terms employed, in the light of my researches, really mean one and the same thing, as I shall demonstrate later. It is well, however, to retain two terms, because they indicate, to a certain extent, the location of tooth destruction.

In my papers, "Pulp Degeneration," "Constitutional Causes of Tooth Decay," "Constitutional Causes of Tooth Decay, Erosion, Abrasion and Discoloration," I demonstrated that the teeth at different periods of life soften and discolor in circumscribed areas or as a whole, as a result of nerve-end and artery degeneration, due to disease, especially nerve diseases, neurasthenia, nervous breakdown and faulty nutrition. In many of my earlier papers I have shown that in nearly every diabetic, tabetic or paretic dement, erosion and abrasion were present. These changes in nerve-end and

arterial degeneration, due to malnutrition and autointoxication, affect the pulps of the teeth and alveolar process and cause destruction of cement substance between the enamel rods and alter the vitality of tooth structure.

Prof. James Truman of the University of Pennsylvania did research work on erosion many years ago. He was dissatisfied with the many theories then extant and made some researches along this line. Satisfied that it was the result of acid action which had not its origin in the cause of caries, he undertook a series of tests. The result demonstrated that there was no positive reaction in the mouth during the day. The exceptions were not worthy of consideration. He then sought to discover when and where acid was formed—as acid, in his opinion, it must be. Another series of tests were made at night, or rather before rising in the morning. He naturally began upon himself, and found invariably a distinct acid response. Then he secured the cooperation of a number of students, who were to bring the results to him. This confirmed the conclusion that at night, when the secretions are quiet and the alkaline saliva practically ceases to flow, fermentation sets in and a marked acid reaction takes place. It is during these periods of rest, therefore, that the greatest amount of tooth destruction takes place. The mucosa falling upon the anterior teeth, and frequently on the buccal surfaces of the posterior, slowly but surely eat a place in the enamel. The polishing is accomplished by the constant passing of lips, tongue, food, etc.

The treatment he adopted seemed to prove the acid theory. He used in all cases a magma of precipitated chalk (chalk and water paste), placing it under the lip at night. The result was a cessation of the destruction. His wife's nephew at eleven began to show destruction of the enamel on both laterals. He was too young to have the cavities assume the phenomena of erosion, but he placed him under the chalk treatment. He is now over thirty, and the teeth have remained as they were at that time. Abrasion is due not to mechanical wear alone, but to the combination of acid action and attrition.

Dr. Michaels of Paris has done considerable work on hyperacidity of the saliva, and has determined that when the blood becomes of a lessened degree of alkalinity because of the accumula-

tion of acid products not eliminated from the system, the secretions and excretions of the glands become acid in reaction.

I accept the acid theories of Truman and Michaels of erosion and abrasion, that the acid is deposited upon the teeth from the mucous glands and gums, that the action of acid upon the teeth is greater at night than in the day, because the saliva practically ceases to flow at night. But does not the saliva, which normally is alkaline, sometimes becomes acid? Is the acid from the mucous glands due to "fermentation?" Do chalk preparations or other antacids applied under the lips night or day, or both, stop the formation of acid and thus prevent erosion and abrasion? Clinical experience says not. That the action of acid upon the teeth is retarded when the treatment is faithfully conducted for months and years, is true. When occasionally applied, or when applied for a short time, the results are only temporary.

The causes which produce erosion and abrasion may be one of three factors, or all three may be necessary. First, change in tooth structure, due to systemic changes and disease; second, secretion of acid by the mucous glands, and third, friction by the action of the teeth on one jaw against those of the other, from foreign bodies, or by action of the lip or cheek. Soft areas, due to change in the teeth by systemic diseases, may be worn away by the action of acids direct from the glands, or by the action of the lips and cheeks, or by friction of foreign substances. Acid secretions alone will in time destroy normal tissue. Friction by foreign agents or by the teeth of one jaw against those of the other, without acid, will in time also destroy normal tissue.

Since local applications will not destroy the acid mucus or restore acid saliva to alkalinity, its normal condition, the question naturally arises, how is this acidity produced? In my studies upon the urine in relation to autointoxication causing interstitial gingivitis, I was struck by the coincidence of the abnormal degree of urinary acidity with this condition in many cases. In these mouths erosion and abrasion were frequently observed. This important discovery led me to examine the urine in every case where erosion and abrasion were present, to discover if acid intoxication was present. One phase of autointoxication, that of acid intoxication in

relation to erosion and abrasion and incidentally to interstitial gingivitis, is the subject of this paper.

The greatest destruction of the teeth was upon the labial, buccal, grinding and lingual surface as observed in diabetics, tabetics, paretic dements and luetics.

The degree of acidity of the urine in my own patients and in those of physicians and in public institutions ranged as follows:

DEGREE OF ACIDITY IN DIABETICS.

Through the kindness of the Columbus Medical Laboratories I was allowed to make a report of the urine of diabetics sent to them for examination. Three hundred and ninety-four examinations were made. Two passed 4 degrees, two 6, one 7, two 8, six 10, five 12, sixteen 14, one 15, fifteen 16, one 17, thirteen 18, twenty 20, one 21, twelve 22, one 23, ten 24, two 25, fourteen 26, sixteen 28, one 29, twenty-two 30, seventeen 32, thirteen 34, four 35, twenty 36, two 37, eleven 38, two 39, thirteen 40, one 41, eight 42, seven 44, two 45, eight 46, two 47, five 48, five 50, five 52, one 54, twelve 56, one 57, four 58, five 60, one 62, one 63, three 64, two 66, two 68, two 70, three 72, one 74, one 75, one 100, two 104, one 120.

Acetone. Of this number of cases, only nineteen were examined for acetone; in 11 acetone was present, in 8 absent. Thirty-two were examined for diacetic acid; in 6 it was present and in 26 absent. Twenty-four were examined for B-oxybutyric acid; in all it was negative.

Uric acid. The examination for uric acid of three hundred and seventy patients showed it present to a greater or less degree in 56 and negative in 314—or about 15 per cent had uric acid.

DEGREE OF ACIDITY IN TABETICS.

Of thirty-five tabetics, one passed 5 degrees, one 6, four 9, two 10, one 11, one 17, two 19, two 20, one 22, one 46, one 48, one 49, one 50, one 56, one 62, one 73, one 76, one 78, one 81, one 82, one 84, one 97, one 99, one 112; four were alkaline. The patients having the alkaline urine had marked erosion of the teeth, showing that at some time there had been a high degree of acidity. Cystitis caused the urine to become alkaline. All showed indican to a greater or less extent.

DEGREE OF ACIDITY IN PARETIC DEMENTS.

Twenty-one males, four females. Three passed 5 degrees, one 7,

three 8, two 9, one 10, one 11, one 12, one 13, one 15, two 16, one 17, one 22, one 28, one 34, one 38, one 39, one 44, one 51, one 52, one 70. The patients were in a quiet state. If the urine could have been examined after excitement or an explosion, the degree of acidity would have been greater.

DEGREE OF ACIDITY IN LUETICS.

One passed 24, one 96, one 105, one 116.

DEGREE OF ACIDITY IN PRIVATE PATIENTS.

In my own practice one hundred and thirty patients were examined. Three were also sent to me by Dr. J. E. Keefe of Chicago. All ranged from eleven to eighty-four years of age. All showed erosion and abrasion to a greater or less extent. Three passed 2 degrees of acidity, three 8, two 10, two 11, seven 12, two 14, two 15, five 16, six 18, two 19, eight 20, five 22, five 24, six 26, four 28, two 29, six 30, two 31, four 32, two 33, three 34, nine 36, two 38, two 40, two 44, five 46, one 47, two 48, two 50, five 52, five 54, four 56, one 58, three 60, two 62, five 70, one 90, one 115, one 117, one 132; only four, or 3.8 per cent, had uric acid.

I quote here from a previous paper, "Interstitial Gingivitis Due to Autointoxication," my first fifty patients' degree of acidity: One passed 11 degrees, two 12, one 14, two 15, one 16, two 17.5, four 20, one 22, one 24, five 30, seven 36, two 40, two 44, one 46, two 56, one 58, one 59, one 60, two 62. Three per cent had uric acid; all had indican.

The method of obtaining the degree of acidity of the urine is given by Neubauer and Vogel. The instruments necessary for this work are: One burette 50 ccm.; one wooden stand; one Barnes dropping bottle; one 10 ccm. graduate, and one small glass. Place the burette in the wooden stand in an upright position; fill the tube with the solution (decinormal sodium hydrate) to exactly 0. The degree of acidity is obtained by taking 10 ccm. of the urine specimen, measured in the graduate glass and then placed in the small glass; add four drops of phenolphthalein solution as indicated, and then adding drop by drop NaOH (decinormal solution, sodium hydrate) until a slight pinkish color is produced. Having noted on paper the number of ccm. of the NaOH in the burette before and after the pink color is obtained, the number of ccm. displaced multiplied by 10 (in order to find the number of ccm. NaOH necessary

to reduce 100 ccm. urine) equals the degree of acidity. Each step in this operation must be carefully performed; each instrument and the surroundings must be kept perfectly clean in order to get good results.

The normal degree of acidity of the urine is from 30 to 40 degrees. When the degree is below 30 (the difference between the degree indicated and 30 shows the degree retained in the system), it indicates either renal insufficiency or excessive suboxidation products, producing renal strain. In cases in which the degree of acidity exceeds 40 there is excessively imperfect oxidation, which, irrespective of the types of acid, underlies, as is now pretty generally recognized, severe constitutional stress allied to that of diabetic acidosis.

There are two great functions of the kidney, excretion and elimination. Excretion does not necessarily imply elimination. Indeed, many of the polyuric states (increased excretion), as in diabetes, in lues, and in the states with nervous urine, are attended by decided decrease of eliminatory power. Imperfect oxidation states may act in two ways on the kidney. They may increase its excretory powers at the expense of its eliminatory power, causing what is known as renal insufficiency. In this case a lessened proportion of the substances usually eliminated occurs in the urine, the rest being retained in the circulation. On the other hand, an increased proportion of the products of suboxidation beyond normal generally occurs where there is an increased production of these in the system. A decreased degree of urinary acidity is attended by symptoms due to the retained acids. An increased manufacture of acid in the system is attended by an increased degree of urinary acidity, which increased degree, however, very often indicates a disproportioned elimination of the acid products actually present in the system. The degree of acidity must be obtained as soon as possible, since the free acids or alkalis cause fermentation of the urine.

It is claimed that fruit acids are converted into alkaline substances in the system. This is only partially true. The liver and tissues become overworked. Acids which are taken into the stomach as food are in excess and are stored up in the system.

The fruit habit (especially grapefruit), so generally indulged in

to excess in America, is producing havoc in the alveolar process, gums and teeth.

One case is sufficient illustration of the many I am called upon to treat. A woman, twenty-seven years of age, had her teeth and mouth put in good condition in January, 1907. On February 16 she returned with what she thought a cavity at the gingival margin of the upper left cuspid. Upon examination I found the gums inflamed and receding, not only at that particular location but about all the teeth. Previous to this the gums and mucous membrane were in fairly good condition. Litmus test showed the mucus to be very acid. There was no cavity, only sensitive dentin. Much gas was passing from the stomach. Upon interrogation in regard to her food, she informed me that she had been eating grapefruit every morning for three weeks. Urinalysis of a twenty-four-hour specimen showed the degree of acidity to be 14 degrees; 16 degrees were retained in the system. The recession of the gums and the sensitive dentin were due to the acid retention.

Wherever there is an endogenous or an exogenous poisoning with which the liver is unable to cope and the strain is thrown on the kidney, elimination proceeds through the skin, the nasal and buccal mucous membranes, and hence through the alveolar process, since the last contains end-organs in which useless products settle. This produces, for example, the blue line of lead poisoning, the green of copper, and the red of mercury.

The tendency to graver diseases as here represented is shown in interstitial gingivitis and absorption of the alveolar process.

The acidity referred to in this paper is not to be confused with uric acid, as I have already shown in this and other papers. About 3 per cent of office practice have uric acid, while 15 per cent of patients suffering with disease, such as diabetes for example, have uric acid. All persons, sick or well, at some period have acid auto-intoxication.

Dr. J. H. Salisbury, in his article "The Alkalinity of the Blood in its Physiologic and Pathologic Relations," says: "The alkaline reaction of the human blood is maintained in spite of the constant entrance into the blood of acids, either taken as food or generated by fermentation in the intestine, or produced as the result of metabolism in the various tissues. . . . All these acids entering the

blood tend to reduce its alkalinity, and if this tendency were not counteracted the reaction of the blood would soon become neutral or even acid.. The mechanism by which the reaction of the blood is regulated and its alkalinity is maintained is of the greatest interest and practical importance to the physician. . . . This compensation is mainly secured by the excretion of acid sodium phosphate, which is produced by a reaction between sodium bicarbonate and disodium hydrogen phosphate, which results in the passage of the acid phosphates into the urine and the retention of the more alkaline sodium carbonates in the blood."

Since the skin and the mucous glands of the mouth become acid, it is suggested by Brubaker that the waste products of faulty metabolism occurring in gout and kindred conditions, floating through the capillaries of the labial glands, produce irritation and the production of an excess of carbon dioxid. This exists in the cells of the glands as carbonic acid, H_2CO_3, and, combining with the alkaline salt, sodium phosphate derived from the blood, the following reaction occurs:

Alkaline sodium phosphate.		Carbonic acid.		Acid sodium phosphate.		Sodium bicarbonate.
HNa_2PO_4	+	H_2CO_3	=	H_2NaPO_4	+	$HNaCO_3$

The acid sodium phosphate formed attacks the phosphate and carbonates of calcium composing the teeth in a double reaction after the manner shown in the following equation:

Calcium phosphate.		Acid sodium phosphate.		Sodium-calcium phosphate.		Acid calcium phosphate.
$Ca_3(PO_4)_2$	+	H_2NaPO_4	=	$NaCaPO_4$	+	$2HCaPO_4$

The acid calcium phosphate is further acted upon by additional molecules of the acid sodium phosphate (dihydrogen sodium phosphate) as follows:

Acid calcium phosphate.		Acid sodium phosphate.		Sodium-calcium phosphate.		Diacid calcium phosphate.
$2HCaPO_4$	+	H_2NaPO_4	=	$NaCaPO_4$	+	$CaH_2(PO_4)_2$

The diacid calcium phosphate is freely soluble and is doubtless washed away.

To note the acidity of the mouth, take a strip of litmus paper, hold it over ammonia until it is quite blue, and apply it under the lips upon the gums, holding it in position for a minute or two. If the mucus be acid it will turn the blue paper red; if it be alkaline,

the paper will remain blue. This method is only partially satisfactory, and means very little so far as the urine is concerned. A more satisfactory method for the urine is that already mentioned. A still more simple method (since the agents are at hand) is to use phenol-phthalein as an indicator. Place a small quantity of urine in a glass, add drop by drop the phenol-phthalein. If acid it remains colorless; if alkaline, it is pink. If the litmus paper shows the mucus to be acid and there is an abnormal degree of urinary acid reaction, the chain of evidence is complete. Professor Truman, therefore, is entitled to credit for his early researches in this direction.

The literature upon the subject of acid autointoxication is meager, and does not extend back many years. Different terms have been substituted for acid intoxication in later years, such as acetonuria, acetonemia, aciduria and acidosis. Acetonuria was first recognized in diabetes by Petters in 1857. Garhardt about 1880 demonstrated acetone associated with diacetic acid and B-oxybutyric acid in the blood in diabetic patients. The so-called acetone bodies, acetone, diacetic and B-oxybutyric acid, are symptoms of disordered metabolism. All three of these acids are closely related. According to T. Stuart Hart, by oxidizing B-oxybutyric we obtain diacetic acid, and when diacetic acid is heated to 100 degrees Centigrade it is easily decomposed into acetone and carbonic acid. Later it has been shown that acetonuria occurs under other conditions and in other diseases, such as scarlet fever, erysipelas, diphtheria, pneumonia, etc. All the depressed mental states, whether occurring singly or in compound psychoses, like paretic dementia, cyclothymia, katatonia, etc., are attended by suboxidation, as Meynert long ago showed; hence, as Coriat has lately proved, by acid states, acetone, diacetic and B-oxybutyric acid.

Dr. James Kelly has shown that acetone, diacetic acid and B-oxybutyric acid in the urine have been recognized in the following classes of patients: (1) In the late stages of diabetes mellitus; (2) in starvation; (3) in malignant growths; (4) in digestive disturbances; (5) in septic processes, general or local; (6) in infectious fevers; (7 in pregnancy associated with a dead fetus; (8) in certain psychoses; (9) in autointoxications; (10) in chronic morphinism; (11) in phosphorus poisoning; (12) following gen-

eral anesthesia; (13) in injuries to the cerebro-spinal system; (14) in shock due to injury; (15) in cases associated with fatty liver, and probably (16) in cases of uremia.

Research work upon acid intoxication and the acetone bodies is in its infancy. Most of the work of value has been done since 1900; the greater part of it has been written in the past two years. For our purposes, in this paper on erosion and abrasion we must limit discussion to acid intoxication, since the urine of ordinary office patients suffering with erosion and abrasion does not contain the acetone bodies.

With the urine, in evolution, comes an increased oxygenation, and with this a decreased acidity in the urine excreted. The normal degree of acidity in the urine is from 30 to 40 degrees. Unnatural methods of living, such as excesses in eating and so-called simple food, alcohol abuse, etc., will cause an excess of the acidity in the system.

Disease of pregnancy will also change the degree of acidity. For example, in the simple cold of a child five years of age, the degree of acidity was 90. This degree of acidity was readily reduced in ten days, therefore the effect upon the teeth, gums and alveolar process is *nil*. On the other hand, in a case of pregnancy, where an abnormal degree of urinary acidity may extend over a period of six to nine months, some destruction of the alveolar process and teeth is bound to occur. Since the alveolar process, gums and teeth are transitory structures as well as end-organs, the destruction is more rapid than in other parts of the body. The gums are especially affected in systemic changes, since they possess sensitive glands.

What, then, must be the condition of the urine in those persons who have lues, tuberculosis, Bright's disease, diabetes, and nervous disorders, and in high-livers whose abnormal degree of acidity has continued for many years. It will be readily understood how almost instantaneously erosion and abrasion may begin upon the teeth, and how almost instantaneously the destruction will cease on a change in methods of living and a restoration to health. A sea voyage, a trip to Hot Springs, or a complete change in environment, will reduce the acidity of the urine to nearly or quite normal. The secretion of acid from the mucous glands and gums will cease.

This accounts for the fact that in some of the examinations the urine was normal in acidity. The fact that erosion and abrasion were slight or severe in a given case, and that urinalysis showed the urine to be normal, does not prove that it had been always so. In some of the patients, especially those with nervous diseases, the urine was found to be alkaline. In these cases the destruction of the teeth was unusually marked. The degree of acidity was not checked in the system, but the patients were suffering from cystitis and the urine became alkaline in the bladder.

In any condition where there is an irregular strain on the heart in circulation, as there is in business and other strains, there occur imperfect oxidation, imperfect hepatic action and imperfect renal elimination. All these conditions together or singly produce metabolic changes underlying acid states.

In the papers mentioned at the beginning of this article, a number of patients were described who, from overwork, grief, mental depression and nervous disease had rapid decay of the teeth, destruction of the alveolar process (interstitial gingivitis), erosion, abrasion and discoloration. I have gone into detail as to the cause and have demonstrated microscopically artery and nerve-end degeneration of the pulp and alveolar process, which produce change in tooth-structure—softening of the entire structure or areas.

The lessened degree of alkalinity of the blood, or acid intoxication of the system, causes contraction of the arterioles, lessening the blood supply and causing vasomotor neuroses and arteriosclerosis in end-organs such as the pulp and alveolar process. The teeth change color with age, just as the excretory organs become senile and sluggish and the blood thin, the result of acid autointoxication. In sickness, also, the teeth that were once hard change color, soften and decay. Acid autointoxication is caused by over-production and want of proper elimination. In pregnancy faulty metabolism and acid autointoxication are present, the teeth discolor and soften, and decay is rapid, but in most cases the system is restored to normal after child-birth and the teeth to a degree recover their color and strength. In close and frequent pregnancies, however, the effect is more demonstrable and lasting. In scarlet fever Bright's disease often results, from kidney insufficiency, the teeth decay rapidly, and interstitial gingivitis is very marked. The system is overcharged

with acid autointoxication. It would seem that the acidity of the blood acts directly upon tooth-structure from without and within, causing discoloration, softening and destruction of cement substance between the enamel rods, as particularly observed in diabetes. In luetics, diabetics, tabetics and paretic dements these changes are most marked. There are many other diseases, particularly those of faulty metabolism, in which similar results are obtained. Petres and Vaillard have shown that in typhoid fever nerve-end degeneration takes place. Later observations have shown changes in nerve-ends and arteries in tuberculosis, leprosy, diphtheria, alcoholism, carcinoma, inanition, marasmus and arteriosclerosis, in the so-called rheumatic neuritis of the facial nerve and in inflammation due to articular rheumatism, in gout, puerperal infection, drug poisons, etc.

To illustrate how effectually nervous breakdown will cause nerve-end and arterial degeneration, tooth-softening and discoloration, I will describe one of my own cases: Mr. A., sixty years of age, from mental and physical overwork broke down in August, 1906. He had been a patient for thirty years and had been under constant observation. His gums and teeth were in perfect condition, had not had a tooth filled or gums treated for twenty years. The teeth were cleaned regularly every six months. The teeth were hard as flint. After the breakdown severe pains were felt throughout the body, especially in the lower and upper extremities. A space upon the left leg above the knee the size of the hand was cold and numb. A gold filling in the mesial surface of the right central incisor dropped out without decay. Disintegration of the enamel is taking place about the approximal filling in the left central. The enamel around gold fillings in the lower left first and second bicuspids and first and second molars have already begun to disintegrate, and erosion is plainly visible. The gums and alveolar process are beginning to recede about the upper left molars. Litmus tests show marked acidity of the gums and lips. Urinalysis at different periods between December 1, 1906, and January 1, 1907, shows the following degree of acidity—11, 12, 20, 32, and that from 10 to 19 degrees of acidity were retained in the system until it was reduced to normal, above 30. How long the excessive acid state had existed in the patient I am unable to say; probably for some time.

In some patients nerve-end and arterial degeneration are so rapid

that the pulps of teeth are destroyed and erosion causes exposure of the empty pulp chamber. In others the arteries are destroyed, leaving sensitive filaments of nerve fibers in the pulp chambers. Since the constant use of the tooth brush, or friction from other causes, with a slight acidity of the secretions of the mouth, will destroy healthy, normal tooth structure, how much more quickly will it destroy areas or entire tooth structure when changed by disease! When pulp degeneration and destruction of the alveolar process occurs, the tooth above the healthy line of the pericemental membrane is dead. This accounts for those anomalies referred to in Figs. 106, 107 and 108, "American System of Dentistry," where all the teeth are worn to the gums; and in those cases where the carbonates and phosphates are removed and only the animal tissue, resembling horns, remains. Nerve-end and arterial degeneration only will account for the frequent occurrence of erosion and abrasion of the central incisors, upper and lower, in many cases, while all the other teeth are normal.

The gums, the alveolar process, and the pulp of the tooth, being end-organs as well as transitory structures, are the first to feel the influence of metabolic changes and autointoxication. Destruction of tissue is the result.

In these days of prophylaxis, the dental profession has an advantage over the medical in the fact that the laity seek the services of the dentist two or three times per year and can be forewarned of the approaching storm, while the physician is not called until the storm has broken. The subject of interstitial gingivitis in relation to acid autointoxication was discussed in a previous paper (Dental Digest, 1906).

TREATMENT.

The treatment consists in reducing the acidity of the urine to normal, 30 to 40 degrees. This is accomplished by giving the (adult) patient from ten to thirty grains of sodium bicarbonate, or sodium chlorid one-half teaspoonful (forty-five grains) after meals, or sodium phosphate, morning and evening; one-tenth grain of calomel every two hours until a grain is given to stimulate the liver and cleanse the bowels. This may require from one to four weeks or even longer; frequent urinalysis will determine the time. If

indican be still present, intestinal antiseptics are indicated. Eight to ten glasses of water should also be taken daily.

The matter of diet and hygiene is all-important in this connection. No definite rule can be laid down; each patient must be advised according to symptoms. There are, however, a few general rules which may be prescribed in all cases. First, discard all meats, using chicken, fish and vegetables instead. If the acidity be due to sugar fermentation, avoid starchy foods and sugars. In some cases fruits (cooked or uncooked) must not be used; in others liquids must be discarded at meals. Coarse foods must be eaten, with plenty of time to masticate and thoroughly insalivate them before swallowing. Hot baths and a general cleaning out and up are indicated, with plenty of outdoor exercise in the sunshine. Local treatment of the gums is necessary.

DISCUSSION.—*Dr. Joseph Head,* Philadelphia, Pa. The subject of Dr. Talbot's paper is of very great importance, and one to which we cannot pay too much attention. Three or four years ago I carried on some tests on the effect grits, in conjunction with tooth brushes, would have upon the teeth, and I found that erosion or abrasion grooves could be absolutely reproduced in teeth out of the mouth, with brush and a grit powder, as we find them in the mouth. In plain words, I found out conclusively that while there is chemical erosion, there is every reason to believe that mechanical erosion with the tooth powders is largely responsible for the characteristic grooves that we so often find around the necks of the teeth. This was particularly interesting, owing to the fact that it was on the front teeth that the grits made the grooves, and that in the third molars the latter were wanting. I have yet to find a third molar grooved at the neck as we find the other teeth, and for that reason I should like to ask Dr. Talbot if he has ever found this particular smooth groove on the back or side of such a tooth. [Dr. Talbot shook his head.]

Since he has not, it would seem that erosion is chemical dissolution that may be combined with abrasion. About three years ago I endeavored to find an acid in the mouth that would attack zinc oxyphosphate with the same eagerness that it would the enamel, and am still searching for it. All the known acids of the mouth I have tried in various solutions and find that they invariably attack

the enamel of the tooth more readily than they do the cement. But while failing to discover the acid that would attack cement and not the enamel, I became interested in the action of acids on the tooth, and was very much helped in this direction by the work of Brubaker, which was presented in 1894, in which he showed beautifully that suboxidation and the piling up of carbon dioxid in the blood was apt to be associated with the presence of acid sodium phosphate in the saliva. Later on the action of this acid calcium phosphate was studied by Dr. Kirk in a most interesting series of articles. First, he worked it out synthetically by knowing what salts he expected to find in the mouth. Second, by dialyzing the saliva he succeeded in demonstrating the undoubted presence of acid sodium and calcium phosphates. Through this we had a fundamental practical basis upon which to start. I have given much attention to the action of acid sodium phosphate and acid calcium phosphate, and back of the action of the acid sodium phosphate is the fact that it will attack the surfaces of the enamel, and as it does this, it at once deposits the basic salt, making a smooth glaze-like appearance on the surface, and with one or two minor exceptions it has been the only acid I have found that ever attacks the surfaces of the enamel and gives the characteristic glaze that we find produced ordinarily, according to our supposition, by the tooth powder and brush. Now, the presence of acid sodium phosphate and acid calcium phosphate is very difficult to determine. They are found in the urine and in the saliva.

This paper of Dr. Talbot's is most interesting and suggestive, yet I cannot but feel that it is more suggestive than conclusive. He takes the litmus paper, puts it in the mouth, and examines it for acidity just as it is withdrawn. If the litmus look red the saliva is probably acid; if it be blue, however, it may not mean that the saliva is not acid, but simply that he has missed the acid. We frequently find that to be the case, and I think if Dr. Talbot hereafter, when making tests with litmus, will dry the paper, he will find in many cases that the supposed neutral or alkaline reaction is in reality acid. So I should feel, under these circumstances, that the tests or the data on which his conclusions are based are faulty.

Now, there is another point. This acid sodium phosphate, as I said before, is a very subtle salt to find. Take for instance Sut-

ton's "Volumetric Analysis," which says that saliva that was neutral to litmus frequently showed an alkaline reaction to lacmoid or Congo red, and at the same time it may show acid to turmeric paper. We may take two samples of the same saliva and one may turn blue litmus red, the other red litmus blue. Let us see what effect small quantities of acid may have upon the teeth. I have found in a course of recent experiments that one part to twenty thousand of acid sodium phosphate will cut the tooth more rapidly than a watery solution of one to twenty parts, and yet this one part to twenty thousand does not show on litmus until dried, and weaker solutions may not show at all. Now, in every one of the cases Dr. Talbot mentioned, he cannot, unless the litmus is dried, say that there is no acid sodium phosphate present, and litmus is such an ineffective reagent with these acid salts that I doubt if he has any real data on the subject.

Dr. Truman, while using the litmus tests, I think admits that they are crude, and says that our tests concerning the alkalinity of the mouth will have to be revised. Every test for the last fifty years is practically untrustworthy, and until somebody can give us some really simple test by which we can prove whether this acid sodium phosphate in small quantities may be present, and that other acids of similar nature may be present, I think we shall have to admit that we are hopelessly in the dark. Now, I do not mean to say that there is not a great deal to be said in favor of what Dr. Talbot mentioned, but if he feels that by means of the litmus he is able to diagnose cases, and tell just what is the matter and what is going to happen to that patient, I feel, as far as I am concerned, that we are leaning on a very weak staff.

I want to say that Dr. Talbot is correct in his treatment of these acid or gouty conditions. His remarks in this field are not to be criticized; only I do not think there is any one very effective diet list. If you will examine the diet lists of twenty or thirty eminent physicians, you will find that pretty nearly everything is excluded, and the conscientious patient would starve. In other words, while these diet lists are very scientific, I think it comes down to the fact that you must give the patient that which will agree with his individual case. And so outside of his diet list it seems to me that Dr. Talbot's remedy is reduced to examining the

acidity or alkalinity of the urine. That is a wise precaution, but of itself will hardly lead us to a universal panacea for the cure of erosion.

Dr. M. L. Rhein, New York. The type of disorders discussed by the essayist I have studied in my limited way for a great many years, and it was gratifying to me to listen to the statistics and clinical results that have been read by Dr. Talbot, as they confirm almost entirely the results that I have, at various times during the past fifteen years, published to the profession. His paper especially bears out the results of a paper of mine, which I read before the Odontological Society of New York in 1896, on the oral expressions of malnutrition. At that time I gave a résumé of a number of cases of systemic diseases illustrating the various forms of oral expression that such diseases would manifest, and I chose for the purpose cases from my own practice. Therefore it is a pleasure for me to be able to entirely substantiate in my limited way all of the essayist's assertions in regard to the detrimental effect upon the tooth structure and the surrounding tissue of anything that will affect general nutrition. I am heartily in accord with his statement that because these are end-structures and transitory structures, similar to the nails and hair, the first symptoms of malnutrition in any form whatsoever will manifest themselves in what may be termed the dental structures. In that paper I also called attention—and I cannot find any other published document making this particular assertion—to the great similarity between what the author chooses to call interstitial gingivitis and the various forms of erosion and abrasion resulting, separately and combined, from these same diversions from the normal. They have always to a great extent been classified and looked upon as due to different causes, and I am pleased to have seen the essayist group them together in the way that he has. So that so far as clinical observations go, I am thoroughly in accord with the author.

He has, however, in his paper today, presented a phase of the reading of these conditions of the system that is entirely at variance with accepted pathology at the present day. It would be absurd for me, because I do not personally agree with this presentation of the essayist's view of pathology, to dogmatically deny its correctness. But it is important, before we accept any such new pathologic doctrine as this, to be sure that the steps which have led to these

deductions are correct, and they will have to be properly substantiated. In the paper as presented to us the author has failed to offer any distinctive proofs of the correctness of his deductions. In the first place I agree with him as to the important bearing on this subject of the fact that the several forms of erosion differ in their outward manifestations. They vary very greatly, and the study of these variations is in its infancy. These forms, speaking from clinical observations, differ according to the nature of the abnormal state of the individual, and if you stop to consider what this means it will bring to your attention how varied can be the symptoms, because that is all that the erosions are, a symptom of an abnormal systemic condition. Recognizing fully that urine analysis will faithfully show any existing serious digression from the normal, I cannot place much importance upon any form of urine analysis as a diagnostic aid in determining the exact disease producing the pathologic symptoms. For this purpose I believe urinary examination to be the most useless form of examination that we have in general medical diagnosis. This opinion is the result of very careful study of a large number of serious cases. Let me try and make the point clear by citing a series of cases which I started to illustrate in the paper that I read eleven years ago. I there mentioned the case of a cousin of Dr. Ottolengui's. The patient was brought to me for consultation at that time by Dr. Ottolengui on account of the loosened condition of the teeth, and notwithstanding that they had been tightened by Dr. Ottolengui, they were subject to repeated occurrences of the disease. I made a diagnosis, entirely from clinical appearances, of Bright's disease. Her physician, who was a man of great reputation in New York, was surprised, because he had been trying to find out the trouble with the patient but had failed in his urinary examinations to come upon anything that would evidence any form of nephritic condition. It was only much later after repeated examinations that finally, in the graver conditions of the disease, casts were found, and my diagnosis was corroborated. The patient died shortly afterward. This case is the parallel of many cases of Bright's disease which I diagnosed as such, and in which for some years all possible urinary analysis failed to corroborate the early diagnosis.

Only this week a dentist in New York, Dr. Geffers, came to my

office—I would first say that I would like to bring out a case that you can all substantiate—came to see me in reference to the condition of his own gums. It seems that five years ago Dr. Geffers brought his wife to me for this same purpose. I made a mouth diagnosis of Bright's disease in her case at that time, and told him that local treatment attempted under these conditions, no matter how efficacious or how efficient, would be unavailing unless the nephritic condition underlying her trouble was understood and could be combated. He went with my story to his physician, who pooh-poohed it. Impressed by what I had said, Dr. Geffers left his physician and consulted another. In short, his wife's mouth was under treatment in my office from early fall until March, and during that time half a dozen physicians examined the case and all pooh-poohed the diagnosis of Bright's disease. Finally, the case left my hands and it was not until within a week that I again saw Dr. Geffers. The first thing that I asked him was regarding his wife, and he said, "Did you not know that my wife died four years ago? I took her to Europe and no physician there was able to understand her condition or to substantiate your diagnosis, but when we returned to this country a diagnosis was finally made of Bright's disease, and she died shortly afterward." Now this is a startling presentation of facts in connection with this subject and it is for that reason that I have mentioned names, because I want you to realize that I am not theorizing. It means that these end-organs in the mouth show the very first symptoms of malnutrition or general organic derangement of any kind, and if it be true, as I have always asserted, it means that our importance as diagnosticians, as brought out by the essayist, is of utmost value to humanity at large, because in a great many of these diseases the early diagnosis means much. But it is on this account that I value very little these urinary examinations, because, especially in the early stages, the general symptoms of abnormality of many organs are transitory. The urine shows what the kidneys excrete at certain times. If they are acting normally, and if the patient obtains the proper rest, treatment, or diet, whatever it be that is needed, then the disease is absolutely obliterated so far as diagnosis by means of the urine is concerned, and therefore for some years I have valued most highly the work of Dr. Michaels of Paris, because I believe that there rests the

greatest secret of real diagnosis of all digressions of organic conditions. Urinary analysis will always retain a place in diagnosis, but it will be one of corroboration of other media.

Turning once more to the peculiar pathologic dogma of the essayist, there are a number of features that are at variance with accepted research work. He has placed great importance on the renal conditions, and the inability of the liver to take care of these acid conditions under certain circumstances. Ponfick, in some very extensive investigations on this subject, has demonstrated over and again that two-thirds of the liver could be absolutely removed in animals, and still there would be sufficient substance left for the normal functional action to take place. I simply desire to bring out these conclusions adverse to the essayist's statements, in order to make the point of my objection to accepting new views on the pathology of the diseases in question until more accurate data become available. That is to say, the author tells us of the possibility of the blood being acid. While I am willing to agree to it if it can be proved, our present views show us that life under such conditions is impossible.

Now, I was very much interested in some of the statistical cases introduced by the essayist. He spoke a number of times about the occurrence of erosion in pregnant women, and claimed it to be due to the abnormal retention of acidity. These conclusions are entirely in accord with my own observations, especially in those women who bear children in rapid succession; in those cases the evidences of erosion—of uncontrollable erosion—are most marked. When I say uncontrollable, I mean that in spite of the greatest pains being taken by the patient to keep the mouth in a prophylactic condition, and of frequent visits to the dentist, the erosion still goes on. My deduction is that these pregnancies, following so rapidly, have been such a strain upon the physical being of the woman as to induce a condition of malnutrition for both the woman and the fetus. This at once affects the nutrition of the mucous follicles, and the erosion is due entirely to what may be called the abnormal condition of the mucous follicles as the result of lack of nutrition to these parts. Now, let us try to prove this theory by taking up seriatim our reasons for success in the treatment of erosion. The special care which we give to the mouth to obviate erosion, our

constant massage of the gums, and constant toning up of the local parts, is the reason why it is beneficial. It is because this mechanical treatment and keeping the parts free from bacteria result in toning up and forcing arterial blood to these parts in a condition that the natural force of the arteries would be unable to do. In this manner we drive blood into these localities and bring a nutrition which ought to obtain normally, but which would not go on in such a lowered condition of the system, and as a result the pathologic state of the mucous follicles is changed to a normal condition. If this pathologic inference is agreed upon, it naturally proves the correctness of my views on the etiology of erosion. Let us, however, not forget that there are cases when they become so serious that all the prophylactic treatment that can be given them is of no avail to prevent the spread of erosion or interstitial gingivitis.

In closing my discussion I want to bring this particular point to the attention of the essayist: In the present day, in research work, in order to demonstrate the correctness of any such assertions as the essayist has made, it is necessary that they should be backed up by proofs, in the shape of sections of the various organs involved. I mean by that, the pathologic conditions of the liver, kidney and different organs affected must be shown by specimens of these organs thoroughly examined under the microscope.

Dr. F. L. Fossume, New York. I cannot help but support this paper. Dr. Talbot has given his unbounded energies toward placing dental thought on the proper basis. It is quite impossible to understand how conditions tested in the mouth can possibly differ from pathologic conditions in other parts of the body, and inasmuch as the whole thought of this paper has been to place the study of the etiology of dental diseases of the mouth and its organs on the same base as that of diseases of other regions of the body, I think that the dentist will be compelled to employ the same diagnostic means as the physician. The most important and reliable means from which the physician can make diagnoses today is through urinalysis. When the urine is disordered, it is easily traced by clinical experience to the seat or source of the disorder. It is not only the acidity of the urine that must be considered, but likewise the nature of the acidity.

I had two cases this winter, one suffering from pyorrhea and the

other from erosion, and in these cases there was alkalinity of the urine due to phosphaturia, due in turn to acidity of the bladder. In another case of interstitial inflammation, the tissues about the necks of the teeth were extremely sensitive. The patient was in a state of apparent recovery and went to Atlantic City to convalesce, returning in three weeks with the mouth in a worse state than before. A physician was immediately consulted, and his opinion was that the affection was due to poisoning of the blood, caused by a return to the habit of sousing vegetables with vinegar. The urine in that case showed an acidity of thirty-eight per cent, which is not particularly abnormal, but the fact of the mucous membrane being acid when there was a plenteous flow of saliva shows, as Dr. Talbot stated, that the mucous membrane and the skin assume the function of the kidneys when renal elimination is insufficient.

I have found that the medical profession is commencing to recognize us, and to favorably accept the diagnosis framed by the dentist. Of course it is necessary for us to adopt the methods of the physician, and to carry on the work along medical lines, because it is not possible even for the dental surgeon of the highest order of technical skill to overcome systemic disorders, and I cannot help but support Dr. Talbot in almost all he has said. Although these erosions do occur at times in mouths where we can get no positive acid reaction, as explained by Dr. Head, we will find if we work along the line of Dr. Talbot's investigations that we obtain proofs positive of the existence of constitutional disorders—metabolic changes—in patients in whom the dental disorders under consideration develop.

Dr. E. C. Kirk, Philadelphia, Pa. I want first of all to do what my predecessors have done—that is, to express my thanks to Dr. Talbot for coming here and presenting this topic; and, secondly, I am gratified to know that so large and so intelligent a body of dental practitioners is willing to listen to such a paper and to consider it carefully. It seems to me that it marks an advance step when we can take up a subject of this kind in a dental society and for such a length of time maintain interest in its discussion. I may incidentally also say that I am pleased in this connection to recognize the great versatility of the dental mind. We have jumped from the consideration of root canals to metabolism without a jar.

Anything I shall have to say in the discussion of the paper will

be said for the purpose of enforcing the principles for which Dr. Talbot has contended, and even where I shall possibly differ with him in regard to certain conclusions, I differ with him because I believe that what we want is to get at the truth as thoroughly as possible; and I shall ask you to take that as my motive in whatever I may say as enforcing the principles which he has placed before us for our consideration.

I want to make an appeal in the very beginning that we retain in our nomenclature the two terms abrasion and erosion, not alone for the reason that Dr. Talbot has given—that they serve to indicate relative localities of these disorders—but because I think from the very exhibit that he has made, and from what I think we are entitled to say today that we know about this question, that there are certainly at least two sorts of wasting processes besides dental caries. There is a wasting of tooth structure which is distinctly the result of mechanical action, and there is also a wasting that cannot by any possible means be of mechanical origin, and such light as we have upon the cause of that second condition, as Dr. Talbot has shown us, indicates—in fact, almost proves—that it is due to the solvent action of certain waste products produced under abnormal conditions of the bodily nutrition. Therefore we must retain these two terms, for the reason that they fairly describe these two distinct processes—distinct in their causation, distinct in their clinical characters.

Referring to the experiments in the testing of the oral secretions made by my colleague and dear friend, Dr. Truman: What Dr. Truman did discover, as I understand it, was that under certain conditions or circumstances, in the mouths of patients suffering from erosion, he found an acid reaction as manifested by litmus. I do not think that it is a fair conclusion or deduction to hold that because he did find acidity, that it was necessarily a fermentative process that produced the acid. Dr. Talbot, if I remember the statement in his paper correctly, refers to this series of tests by Dr. Truman as proving the cause of the acidity to be due to fermentation. Is that the point you wished to make?

Dr. Talbot. No, sir; my point was that it did not prove the question of fermentation.

Dr. Kirk. All that it could prove was that acid was present.

I heard the report of these tests of Dr. Truman given from his own lips before the Odontological Society of Pennsylvania a number of years ago. I had myself been making tests of erosion cases with litmus, and I became very much interested in what he said. I was not in agreement with him at that time, but I finally repeated the litmus tests under the conditions which he laid down, and verified his findings. But, further, I became interested to discover the location or origin of this acid secretion, and in a paper which I read before the First District Dental Society of New York in 1887 I recorded the method by which I had located the origin of the secretion so far as its local manifestation was concerned, namely, in the buccal mucous glands. That paper is on record in the Dental Cosmos, and is also referred to in Miller's work. I later became interested in the nature of this acid secretion, and as to the way it was produced in certain individuals; and I noted, just as Dr. Talbot and others have done, that this acidity of the buccal mucous secretion was related to a certain type of cases, certain types of malnutrition, a type that we have come to recognize or classify under the general term of arthritism, or what was called in the paper under discussion, following the terminology of English and German writers, gouty diathesis or suboxidation—a type of disorder in which the characteristic thing is that there is a lack of correct relationship between the oxygen intake of the individual and the amount of food supply, so that the oxidation in the process of food metabolism is improperly performed (under-oxidation), and it is in connection with that class of cases that my observations were made. I then became still further interested by the work of Brubaker, to which reference has been made. Professor Brubaker, while not a practicing dentist, is a scientific physiologist, and he made the valuable suggestion that it was quite possible and highly probable that in those individuals who are suffering from this condition of suboxidation, the accumulated carbon dioxid in the blood plasma reacted as carbonic acid upon the basic phosphates of sodium and of calcium, and by chemical interchange, as Dr. Talbot has shown, converted these basic phosphates into acid phosphates. It is a well-known fact that in that form of malnutrition characterized by suboxidation there is produced an excess of CO_2, and that the reaction between carbonic acid and the basic phosphates is the explanation of the

normal acidity of the urinary excretion. It is a matter established by chemical investigation that the urine is acid because it contains these acid phosphates, and that the acidity of the urine rises in percentage correspondingly to the degree of suboxidation.

I want to direct your attention here today to a matter to which I have called attention elsewhere, viz., that there is a very definite relation between the amount of carbon dioxid produced through faulty metabolism and the percentage of urinary acidity. I do not expect all to understand what I am saying, but you can study it more carefully after it is published; but this is what happens: Every molecule, or unit, of free acid in the urine represents a molecule or similar unit of carbon dioxid in the blood plasma, for the simple reason that it requires one molecule of carbon dioxid to convert every molecule of the basic phosphates into acid phosphates. What is true of the calcium phosphate is true of the sodium phosphate—the action of the carbonic acid on both of these salts is quite parallel.

But I am unable to understand the reasoning of Dr. Talbot in his explanation of the relation of urinary acidity to the fluctuation in the percentage of acidity of the blood stream; for if he measures the acid retention in the blood in terms of these acid phosphates as expressed by their percentage in the urine, I disagree with him. My objection to that theory is based upon the fact that the acid phosphates both of sodium and of calcium are very much more soluble than the basic phosphates; so that these acid phosphates, because of their extreme solubility, have a relatively high osmotic tension and run out of the system very rapidly, consequently are less liable to be retained than the basic phosphates. So important is that fact that two prominent writers, one Dr. Ralfe of London and the other Dr. Tessier of Lyons, France, have both described a disease, which they term phosphatic diabetes, due to loss of phosphates in this manner, which has all the symptoms of diabetes mellitus minus the sugar factor.

The abnormal phosphatic loss coincident with high urinary acidity is also important because it furnishes one of those interesting demonstrations of the fact that in order to have normal health, a high vitality, a high opsonic index, or whatever you choose to call it, it is required that we shall have a certain number of nutritional

factors working together harmoniously. We require for the maintenance of health, among other things, a proper kind and amount of nutritive material—among which is a definite supply of the phosphates. If these are rapidly eliminated the patient becomes phosphatically starved. And Michaels speaks of this, and refers to a further period in this condition when the patient becomes demineralized because the nutrient reserve of phosphates has become exhausted. This, as I take it, is because the excessive production of carbonic acid in arthritism has rendered the phosphates more soluble, and they consequently leave the system more rapidly, for the reasons I have already explained.

Holding these views I cannot accept the hypothesis set forth by the essayist that diminished acidity of the urine necessarily indicates increased acid retention in the body. I regard diminished acidity of the urine as evidence of lessened carbonic acid production, and consequently less conversion of basic into acid phosphates.

Now, as stated by the essayist, when the eliminative apparatus—for example, the cortex of the kidney—is overtaxed, when it is insufficient for the work of getting rid of the acid phosphates, then other structures epiblastic in origin may and do take up this eliminative function, and the acid phosphates are excreted, for example, by the skin; in these instances we have localized irritation, sometimes expressed as eczema; through the buccal mucous glands, and in that instance we have erosion of the teeth and hypertrophy of the mucous glands themselves. We have all seen these things. So there is not the slightest doubt in my mind, and I wish there were none in yours, that when we have erosion of the teeth we may not do otherwise than call it a symptom of a constitutional disorder, or, if you please, a local expression of a special systemic vice; and we know pretty nearly what that vice is, namely, the form of malnutrition called arthritism. Now, as Dr. Rhein explained, this condition is manifested early in the gums and teeth, long before the patient finds it necessary to go to a physician for the treatment of other local expressions of the same disease, and it is a part of our duty to recognize the meaning of these dental manifestations and to be able to point out to the patient these things, which later will cause suffering from some lesion like a defective liver or arterial sclerosis, unless detected and treated in the earlier stages.

I think that is where our position as health guardians is of the utmost importance.

Reference has been made by Dr. Head to the inadequacy of the litums reaction. It is a difficult thing to make tests with litmus and determine accurately just what reaction you have. Even the acid phosphates do not redden litmus, at least as I understand the meaning of the word reddened, but it "purples" litmus; the acid phosphates will give a purple or violet color with litmus solution which is not at all the same thing as when you put a drop of free acid in it, and yet the former may be mistaken for the latter color. Another thing: When you have the basic and acid phosphates together in a solution, that solution will manifest both a red and blue reaction to litmus. You have here, then, that condition which chemists call the amphoteric reaction. So that solutions of acid and basic salts have to be tested with both kinds of litmus and with other indicators. We will have to revise, as Dr. Head has said, our standard of litmus testing, and I am in accord with his statement that all past records depending upon litmus as indicating the reaction of the saliva, and possibly the urine, that have not taken into account a recognition of the amphoteric factor, will have to be very carefully scrutinized, if indeed they are not wholly valueless.

I want to say one word about urinalysis, because it has been referred to by Dr. Rhein, and I agree with the latter that urinalysis from the standpoint of the ordinary urinalysis report is of little value in the diagnosis of the metabolic conditions, the nutritional states outside of those problems having to do with definite lesions of the kidneys. That is not the kind of analysis we want in our studies of nutrition; but I presume he referred to the chemical composition of the urine, and that is of the utmost importance—almost the most important thing we have to depend upon. I do not agree with Dr. Talbot that the ordinary method of chemical analysis of the urine, which is based upon a study of a sample of the total urine for twenty-four hours, furnishes the most useful data. I think we can get a better picture of the nutritional state of the individual by examining the morning urine—for this reason: The morning urine represents the final result of the complete nutritional effort extending over a number of hours after the last food is taken. I therefore depend upon the analysis of the morning urine

more definitely. I believe that we thus get more information from that kind of a specimen as to how the nutritional mechanism has treated its metabolic problem.

Finally, I would like to say a word as to the question of the diet list, the question of what to eat. I agree that there should be discrimination in the character of the food, and one of the gentlemen referred to the well-known fact that if we go to a number of physicians and sum up what each excludes, we should find in the end that the whole edible list has been cut out. Let us remember that there are two factors to be considered, viz., the quantity and the kind of food that we are taking into this human furnace, and then, the necessary adjustment of these factors—to what? To the amount of oxygen that the hemoglobin is able to carry to the tissues. You may dump an unlimited amount of building materials on a vacant lot, and if there happen to be a strike or no mechanics to use the material, you cannot erect the building. It is the function of the hemoglobin to carry the necessary oxygen, and we have to see that it is present in sufficient amount and in condition to carry the amount of oxygen necessary to the building. If even the hairs of our head are numbered, so also is the amount of hemoglobin in the circulation—i. e. our oxidizing power—as definitely limited, and when you take a greater amount of food than you can manage, you will have faulty metabolism, arthritism, loose teeth, erosion, pyorrhea alveolaris, and for Dr. Talbot's sake let me say also interstitial gingivitis.

Dr. Talbot (closing the discussion). I agree with the last speaker in almost every point. There is no difference between his views and mine as to general principles involved. He speaks of the hemoglobin in the blood, and that is just the point that I made in my paper. If the blood be only partly alkaline, then the acidity must be reduced in order that proper metabolism may exist, and proper food and medicine must be given to build up the hemoglobin.

The first speaker takes up the subject of the particular acids. I avoided that—which answers both Dr. Rhein and Dr. Kirk. I did not want to spin too fine a thread. That is one great trouble with the profession; they want to get down to too fine points in everything. What is needed in science is a working hypothesis, and if

we have not a working hypothesis we can work always and accomplish nothing. I can mention numbers of things published in the dental journals, read in papers before societies, and discussed, for the past eight or ten years—all being wasted because we had not a working hypothesis to start on. We have a working hypothesis here in two points, no matter what the speakers have said who criticized the paper. I thank them for doing so, because I want to know what they are thinking about. If you pat me on the back and say I am all right, I do not learn anything. The fine points in regard to the particular acidity and how it affects the teeth I leave for you gentlemen to work out, but we have here a working hypothesis with which to start.

For more than twenty years I have been working on metabolism, trying to find out how it affects the mouth in interstitial gingivitis, Bright's disease, nephritis—as they are all caused by the same thing—and I am sure that what I have offered will be the means of establishing a working hypothesis. I am not talking at random, for I know at least twenty-five or thirty physicians who are working along this line, and one of them tells me that he can cure eighty per cent of children's diseases by simply watching the acidity and the indican in the urine. The whole practice of medicine is based on these two points, including interstitial gingivitis, erosion and abrasion, and also many other things—as I intend to bring out in a subsequent paper.

Now, there are two points to bear in mind; first, the degree of acidity, and, second, the amount of indican. Correct these conditions and you will correct local conditions. Whether I am correct or not is immaterial; I have brought forth new ideas, and these new ideas will work out something that will be accepted by all. I do know this, however, that by correcting these two conditions you will have a basic principle to work on which is absolute.—*Dental Cosmos.*

THE APPLICATION OF BUSINESS PRINCIPLES TO DENTISTRY. By Frederick Crosby Brush, D.D.S., New York, N. Y. In looking over the broad field of commercial business in search of principles or methods that may properly be adapted to a professional practice, one is impressed that a main factor in attain-

ing success is to have at command all necessary detail with the least possible expenditure of time and labor. It is quite evident that this can best be accomplished by systematic methods, and it is found that the principle of system does and must predominate in all branches of business that show the true elements of success. In fact, system and success seem almost synonymous.

System, however, does not mean the encumbering of business with a mass of unnecessary methods, details and data, an error quite frequently made; but on the contrary, it tends towards simplifying customary methods for the sake of convenience and exactness.

While system as a principle is exceedingly broad and is applicable to all phases of professional practice, it is intended in this instance to refer more particularly to its application in keeping necessary records. The methods described in this paper are offered as a suggestion and are not given with the idea that they are ideal or complete, for it is not probable that a set system will ever be devised that will fill satisfactorily the wants of all practitioners.

The many changes and improvements that have been made in the means of keeping records have caused the term "book-keeping" to become a misnomer, which should become obsolete; and it would seem better to adopt, in its place, the more comprehensive term "record-keeper."

The first and most important record to be considered is that of "Cases," covering all operations and the data connected therewith, which should be kept in some form by every conscientious practitioner. The keeping of such records is essential from many standpoints; in the first place, they are of great importance as evidence in suits for malpractice or damages, in pressing claims for collection and other legal matters; they greatly facilitate the planning of the day's work and the arrangement of appointments, and also assist in advising patients at a distance who may be in trouble.

There are on the market many books and cards with a variety of diagram forms designed for the keeping of such records; all of these have some good features—some of them many useless ones.

An objection that has been made to the book method is that it is cumbersome in form and bulk, entailing the handling of a lot of useless material—first in the form of blank sheets, later by what may be styled "deadwood." Usually this method also involves the

keeping of separate examination or working slips to record the day's work, and these have to be copied into the book later, necessitating extra time and labor.

At the end of the month, when checking up accounts and sending statements, it becomes necessary to go over all the accounts in the book in order to locate the live ones. If the charge or ledger account is kept separate from the case record it means an additional book to write up, and the same objection holds good. The loose leaf system is something of an improvement over the older method, and perhaps can be used to advantage where a competent secretary is employed.

To the busy man who prefers to take charge of his own records a good card method will be found to possess many advantages. The cards should be of a suitable size to fit in a metal case, and this case and its contents should be kept in a safe. Records so protected are likely to go through a small fire with little or no material damage. These records are usually the most valuable assets in an office and practically the only things that cannot be duplicated in case of a loss by fire.

The styles of diagram and ruling to be used are very largely one of individual preference and needs, but they should be selected with an aim toward efficiency in recording necessary detail, and to show such detail clearly in case of future reference. Many books and cards are ruled with innumerable columns for recording specific operations. This seems a waste of valuable space and time, and may lead to many errors. A card with a suitable diagram of the teeth on one side and plain ledger ruling on the other is the most satisfactory, for it combines effectiveness with simplicity.

When called upon to make an examination of a mouth it should be done systematically and with care. A really thorough examination of the teeth for cavities and other blemishes cannot be made unless the surfaces of the teeth are clean and thoroughly dry.

In making the examination have a definite starting point, say the left upper molar, and work around toward the right side, and then the same way on the lower arch, noting carefully every condition and deficiency and entering them upon the chart. If a tooth is missing it may be marked (M) in ink; if a root should be extracted, mark it (X) in pencil; if there are cavities or carious spots,

outline them in pencil upon the diagram in the exact situation and approximately as they will appear when filled. If a pulp is to be devitalized and the canal filled, a line drawn down the axis of the root leading to the cavity will indicate this. If an alveolar abscess is present, a similar line, but with a small circle at the apex, will answer the purpose. If any artificial substitutes are required they may be noted in their proper places. If teeth require separating before operating upon them, this may be shown by drawing a line (/) where the wedge is to go. It is also well to estimate the time likely to be required for each operation and jot it down underneath. By this means you are enabled, when arranging future appointments, to determine just what work you may do and the probable amount of time that will be required in its accomplishment. This method becomes one of the greatest of aids in planning a day's work when a practice is conducted on the time principle and by appointment. When the patient arrives, some days or weeks hence, a glance at the chart will show at once what is to be done, and no time need be lost in getting about it. Remember that time is our greatest asset, and anything that enables it to be utilized to the best advantage is well worth while.

After an operation has been performed it should be permanently recorded upon the chart. Many ways have been devised for doing this, some of them fairly good. A system of marks, in order to be of real practical value, should show clearly and at a glance just what has been done and where. More than this, the marks should so outline the shape of the filling, etc., as to make it possible to identify the work beyond a reasonable doubt. It sometimes happens that redress is demanded for a faulty operation from one who did not perform it; such a case may be quickly settled, however, if the operator has adopted the plan of keeping accurate records with each operation clearly outlined. Again, it may be that a patient, finding it inconvenient to reach his regular dentist, will call upon another to repair or replace an injured filling, etc.; under such conditions the outlines would undoubtedly be changed and will attract the attention of the regular operator at once if the chart is being closely followed when making a subsequent examination.

A system of marks which has been found to answer the purpose very well follows rather closely the ones that were suggested for use

in making examinations, only that they are made with colored inks instead of a pencil. The plan would be about as follows: The missing teeth were, of course, marked with an (M) in ink at the time of making the examination; roots which are extracted are marked (X) in ink; amalgam fillings are carefully outlined and filled in with black ink; gold fillings are outlined and filled in with red ink; porcelain fillings are denoted by merely outlining them with red ink, while guttapercha or cement fillings may be shown by outlining them with black ink. Crowns may be shown by initialing them in red ink as: Gold crown (G. C.); Davis crown (D. C.); Logan crown (L. C.); in bridge work the abutments and dummies may be initialed in a similar manner. The filling of root-canals or the treatment of alveolar abscesses may be indicated by the line, or line and circle, following down the axis of the root and connecting with the cavity through which the dressing was made, as was suggested in the scheme given for making examinations. As each operation is recorded a short marginal line leading to it is made and a number attached, the first being numbered 1, and so on. The reason for this will be given when considering the entries on the ledger side of the case card.

The making of the permanent record immediately following the end of each sitting and in the presence of the patient will at first, no doubt, lead to questioning on his part. The few minutes required to explain the plan and the reasons therefor will be found to be well spent; for any patient is more than likely to be impressed with the idea that such attention to detail would indicate thoroughness as a habit and also that, in case trouble should occur, the operator, by means of such records, would be able to determine and treat the cause of it without difficulty. Little things certainly count very largely for or against, and patients have a way of noticing them far more than we often realize.

The operations having been recorded and numbered consecutively, the reverse or ledger side of the case card is to be made out. A card that is ruled with three columns is the most practical, as it permits of the date being entered without loss of room when payments are made subsequent to the operations.

Making the ledger entry direct and at once simplifies the record or so-called "book" keeping very much, for it does away with the

necessity of making detailed entries in a day-book, which would have to be transferred to the ledger at another time.

In making the ledger entries it is not necessary that each detail be written out minutely in order that it may be acceptable as legal evidence; but it is necessary, however, that the entries be made in such a way as to be clearly understood, not only at the time they are made, but at any time thereafter. A plan of entry that fulfills these requirements, and with but a slight expenditure of time and space, is to enter the numbers that have been attached to each operation as it was recorded on the diagrams. For instance, on a given date the teeth were scaled and a gold filling and two amalgam fillings inserted; these were numbered 1, 2 and 3, respectively. These numbers are entered on the ledger, after the date and followed by the amount of time involved and the charge for the same, at so much per hour. By this means, should the question arise at any time, it can be said definitely just what services were rendered during any particular time for which a charge has been made.

This plan will also serve as a "cross entry," for should it be desirable to determine just when a certain operation was performed, it may be learned by noting its number on the diagram and then tracing back through the ledger entries until the number is found, together with the date of its entry. This quickly settles all dispute as to the length of time a filling, crown or other operation has been serving its purpose.

One drawback to all card methods, where the card is of a convenient size to use on the operating table for reference, is that the ledger space is so limited. Perhaps some day someone will devise a scheme whereby the diagram may be printed on the outside of some sort of envelope or pocket in which there will be room for one or more ledger ruled cards. This would make it possible to take out and file away the "dead wood" and not have to handle it over and over. At present, when one card is filled about all that can be done is to make out another. The time involved is more of an item to be considered than the cost of the cards in such cases.

The filing of the case cards in sections, by means of colored index cards, is a plan that has many advantages. In a section marked "unfinished" should be filed the records of all cases that are under treatment, together with the records of cases that have been finished

but for which a settlement has not been made in full. This will greatly facilitate the sending of statements at the proper time, as only live accounts will have to be looked over. When making examinations it frequently happens that more work is found than the patient wishes to arrange for at that particular time; in such cases, when the work the patient desired is finished and paid for, the record is filed in a section marked "finished." This places before you the cards of a number of people that you know are still in need of further dental services. This arrangement will be of considerable value if "reminder" and "follow up" cards are used. In the third section, marked "completed," may be filed all other records, there to remain undisturbed until a subsequent visit of the patient.

A practice conducted rightly should show a steady growth, and with the increasing demand for time, one is justified in raising the fee per hour. The question of just how this increase is to be adjusted is for the individual practitioner to decide.

There are a number of ways of doing it—one is to set a certain time, after which the increased fee is charged all patients, old and new alike; another is to have the increased fee apply to new patients; that is, those coming after a given date.

If the latter method is adopted it will be found after a time that patients are being charged different rates per hour. This condition is more than likely to exist in any practice, although it is best to have the divergence as slight as possible. The question is, however, how to keep track of things so that a patient or member of a family shall always be charged a uniform fee. This may be easily done by placing at the head of the debit column in Roman figures the amount of the fee to be charged per hour. For instance, at the time the patient first seeks your services your fee is five dollars per hour; in that case a (V) is placed at the head of the column. This remains the fee per hour to that patient as long as you feel that you can afford to work for him at that figure. Later, however, the growth of the practice and demand for time warrant an increased fee even from old and faithful patients; in that case, it is made to read (VI) or (VII) etc., per hour. A glance at the chart will then show at once just what rate is being charged any individual patient.

Because a practice is conducted on the time principle it does not signify that a set fee per hour is dogmatically charged every one;

the fee per hour may be anything from a "thank you" up to as much as you may think you can get, and all during the same day if you like, but the amount of the fee is governed by the amount of time involved in the operations. The system is elastic enough to fit any case and the time principle will apply to all.—*Dental Brief.*

ORAL SURGICAL LESSONS. By George V. I. Brown, A.B., D.D.S., M.D., C.M., Milwaukee, Wis. The following cases are reported not so much because of their features of special or individual clinical interest as for the reason that, collectively, they may serve to illustrate the importance of some considerations, bearing upon oral surgical practice, for the bringing forward of which it seems from my point of observation there is urgent need if the beneficial possibilities that lie before the oral surgeon are to be fully realized.

First: In the absence of reliable, methodically formulated scientific directions for the diagnosis of oral diseases—particularly with reference to differential distinguishment in the case of pathologic affections having more or less similarity in their objective symptoms, though with widely different characteristics—such as are laid down for the guidance of practitioners in other divisions of surgery, the oral practitioner finds himself necessarily in a greater or less degree thrown upon his own resources. The quite natural result of this is that while most individuals tend to become specially skilled in the study of some particular diseases, through having more than ordinary interest in them or for other reasons, yet a broad understanding of differential diagnosis is much more unusual than it ought to be.

Second: While the study of etiology and pathology is constantly receiving more and more attention—a marked awakening having taken place among dentists, practitioners of medicine, surgeons, and even the laity, with regard to an appreciation of the importance of a better understanding of these subjects as applied to oral affections—yet the evolution of the study of cause and effect, and the practical application thereof, in this respect appears to still leave much to be desired.

Third: Too much attention is commonly given to methods of treatment, to the correction of dental and oral deformities and of

pathologic disturbances in this region, with an apparent philosophic acceptance of their natural right to existence, and with too little thought and action exercised in the direction of their prevention.

Fourth: No etiologic factor in this region of unusual pathologic opportunity can be too small to warrant a full consideration, inasmuch as diseases of grave prognosis and severe symptoms result quite frequently from the simplest possible primary causes.

In order to illustrate these principles to better advantage, I have chosen a group of cases affecting the region surrounding the temporomaxillary articulation and the posterior portions of the maxilla and the mandible, because, as is shown by the clinical histories in most of them, the external manifestations in all the cases bore more or less similarity, whereas the etiologic factors were for the greater part quite dissimilar. In some of those in which the symptoms were most grave, the true cause was so simple as to seem, at first thought, almost insignificant.

PATHOLOGIC CONDITIONS THE RESULT OF THE BITING OF THE BUCCAL MUCOUS MEMBRANE OWING TO MALOCCLUSION.

Case No. I. Miss ————, age forty-five. Family history indicates distinct neurotic tendency; asthma, kidney affections, tuberculosis and cancer affected near relatives. The patient's description of her own case is as follows:

In the summer when I was thirty years of age I was exposed to a severe cold wind for about fifteen minutes without proper protection of the face. Just in front of the ear there came an oblong swelling the size of an egg, longest up and down. Mentholated vaselin reduced this condition in about four weeks. The next year, or perhaps the year following, the condition recurred—not so severely, however, and it was reduced by the same treatment in about the same length of time. The first symptom was pain in the face, which lasted for six months.

At about the third week I noticed a hardening of the gland. The doctor thought I was mistaken, as there was no visible sign. I used a liniment of sweet oil, wintergreen and alcohol, and the soreness and swelling were nearly gone when I took cold at night and the gland threatened to abscess. The next day I saw three local physicians, and together they prescribed potassium iodid and an application of "Denver mud." I took a four-ounce bottle of what they called a five-grain solution of the iodid and found that when the Denver mud was kept hot it rapidly reduced the inflammation. About a week after the sudden swelling, Dr. ——— (a prominent surgeon), made an examination and diagnosis. At first he said he hoped it was sim-

ple parotitis, but at the end of the examination said there was some obstruction of the duct to the parotid gland. What it was he did not know, and knew of no way of making sure save by dissecting the gland, and he would rather not do that until just before I died. He said he thought it was a calcareous cyst. When the swelling was at the worst the jaws were apart about a quarter of an inch. As the inflammation was reduced the muscle gave way.

There have been three recurrences of the affection, beginning always with a slight sore throat, feeling like cankers. The duct smarts and stings and is inflamed with pimples along its line, and twice there has been a small canker at the mouth of the duct. The pain of late has been either near the ganglion or near the lower first molar, not on the jaw but in the cheek.

Study of this case developed the fact that this patient was suffering from two distinct classes of symptoms, each having its own etiologic factor. The cause of the repeated swelling of the parotid gland, which had given the surgeons as well as the patient so much uneasiness, was so simple as to appear to be almost ridiculous, and the results of treatment after considerable lapse of time seemed to warrant the assumption that this conclusion was correct. After having differentiated—through diagnosis by exclusion—mumps, syphilis, ptyalism, neoplasm, calcareous deposits within the duct or gland, infection or inflammatory processes affecting the gland structure, it was found that, through malocclusion, the sharp-worn borders of the teeth met in such a manner as to cause frequent biting of the cheek in this region, which happened to be at about the point of the opening of Steno's duct. Thus was easily explained what the patient had thought were cankers at the mouth of the duct, and its occlusion by reason of the local irritation. With the duct occluded, swelling of the parotid gland through retention of its secretion was a natural sequence, as were other symptoms which followed this condition, such as fixation of the lower jaw, pain, and general disturbance.

Anyone who has operated extensively upon or in the region of the parotid gland will certainly appreciate what a serious matter it would have been to have undertaken a radical operation of any kind, when its necessity could have been, as it was, obviated by so simple a procedure as the rounding-off of the buccoocclusal angles of the molars. The symptoms of pain described by the patient, after an examination of the teeth and again by exclusion of the various dental affections which might cause reflex pain,

were easily understood when two teeth were opened up and were found to contain pulp-stones.

Case No. II. Married woman of middle age. In the right cheek a swelling which appeared to begin in the molar region occurred at intervals of a few months. She had had frequent recurrences of this condition, which after a few days would disappear without any particularly painful or otherwise troublesome symptoms. The fact that physicians had either failed to find its cause, or that their diagnoses were so widely different, had led to a state of more or less uneasiness on the part of the patient.

It was found in this case also that the habit of biting the cheek had been acquired. The same simple treatment with corundum disks has prevented return of the affection, so far as known, during a considerable period of time.

Both of these patients were more or less neurotic, and therefore naturally subject to the nervous habit of grinding the teeth to which I have called attention in my previous papers.

RESULTS OF THE "GRINDING HABIT."

Case No. III. Results of the "grinding habit" are further illustrated by a microscopic section from this case, it being a cross section including tooth, pericementum and alveolar structures. Disappearance of the pericementum has brought about a condition of ankylosis, which is shown by the fact that the bone and the cementum are seen to be directly in contact without the intervening pericemental structures.

The patient from whom this tooth was extracted represents a quite common type, but one that receives by far too little attention from the dental practitioner. There was a history of pain, headaches during a long period of years, and other evidences of unstable nervous condition. The occlusal surfaces of the teeth were much abraded, and, upon extraction, masses of surrounding bone came away with the roots.

Ankylosis in these cases is undoubtedly a result of the irritation by grinding and long-continued severe pressure of the jaws in occlusion during moments of nervous excitement, unconscious action during abstraction of thought, and at night, especially when rest is more or less incomplete on account of over-weariness of the nerves. How much or how little this change in the pericementum

may have to do with the great suffering that many of these patients endure more or less periodically year after year is still to be determined, but, making due allowance for the fact that such individuals are always of neurotic tendency, and therefore subject to nervous disorders of many forms. It is nevertheless quite reasonable to suppose that structural alteration in tissue so intimately associated with trigeminal branches is a matter of sufficient importance to warrant its careful consideration, and that it is specially worth while for dentists to give relief to this nerve-exhausting stress through the various methods at their command.

TWO CASES OF MANDIBULAR TRISMUS.

Case No. IV. A man about fifty years of age, dairyman. Found difficulty in attempting to move the mandible. A number of diseased roots in the maxilla on the right side were removed—notwithstanding the fact that there appeared to be no swelling or other acute inflammatory condition—on suspicion that they might be the cause of the trouble; but the following morning the increased difficulty in jaw movement, with noticeable tendency to spasmodic contraction, made it evident that the affection was tetanus, and a slight abrasion upon the cheeck caused by a jagged edge of one of the roots made probable the point of entrance of the bacillus. Fortunately, the affection did not take a virulent form, but became chronic, and after a period of a number of weeks of stimulating liquid diet and antiseptic local treatment the spasmodic symptoms affecting the muscles of mastication disappeared without extension to other parts or the severe symptoms characteristic of acute tetanus.

Our chief interest in this case at the present time lies in its differentiation from other affections which while, interfering with the movement of the mandible, were not tetanic in character.

Case No. V. The patient came under my care at the clinic at the State University of Iowa, and was placed in charge of one of the students of the dental department, whose record of the case is as follows: Man, unmarried, age twenty-seven; student, good habits. Family history favorable. Symptoms: Trismus on the left side of the face. Temperature 99°; pulse weak but regular; respiration normal. Habits temperate.

History of present illness: In the early part of April the pa-

tient came to the clinic suffering from trismus on the left side. Upon examination it was found that he could not open his mouth more than a quarter of an inch. The gums were pale and anemic. The lower left third molar was partly erupted; position normal, with sufficient room in the arch for normal development. The soft palate was badly inflamed, also tissue on the distal side of the molar. Pus was present, due to an infection resulting from a wound received while removing pus from beneath a flap partially covering the occlusal surface. Three or four days after receiving the wound the tissue became inflamed and the muscles of mastication began to get stiff, with very slight swelling. Three days after the infection was started the inflamed tissue was lanced. The trismus increased. I first saw the patient about ten days after the first injury was received.

The treatment adopted was to force the jaws apart with the mouth-gag sufficiently to allow the application of hot phenolized water, followed by tincture of iodin. This was supplemented by hot external applications, massage and alcohol rubs, with internal administration of codein and regulation of the bowels. No effort was made to remove the molar at this time, on account of the danger of direct infection. The symptoms gradually subsided in the course of a few weeks. The malposed molar was subsequently extracted when local conditions had become more favorable.

INFLAMMATIONS INCIDENT TO THE DIFFICULT ERUPTION OF THE THIRD MOLARS.

Case No. VI. Young woman, twenty-one years of age, unmarried. From beneath the partially erupted lower right third molar more or less pus discharged, also around the gum tissue which partly covered the crown.

The history of the case shows a continued discharge of pus for several months with recurrent inflammation in the affected region, which caused more or less swelling and difficulty in opening the jaw. The symptoms shown in the previous cases, of tetanic muscular spasms and spasmodic contraction of the muscles of mastication due to direct nerve irritation, were absent in this case. On removal of the underlying surrounding tissue, it was found to be toughened and hardened by repeated inflammatory processes—to be so resistant that even with exceedingly sharp knives its re-

moval was a matter of much difficulty. Other conditions being favorable for its final complete eruption, the tooth itself was not disturbed. Although the local symptoms were not so distressing as in the other cases, the effect of pus upon the general system of the patient was quite marked.

Case No. VII. I have previously reported this case, and only mention it now in order to complete the series. It was that of a young man, who from an inflammatory process set up on the distal side of the lower left third molar developed noma, and who died from an extension of the gangrenous condition to his lungs.

Case No. VIII. Unmarried man, about forty years old, a skilful surgeon. He was affected during his period of study in Europe with marked swelling of the glands of the neck and in the post-maxillary region; this condition had lasted for quite a number of weeks and had developed quite serious symptoms for which the physicians there were unable to satisfactorily account. His next attack took place after his return to this country, when he came under my care. The symptoms were exceedingly distressing. The lower jaw was almost fixed. There was much swelling in the parotid, submaxillary and other glands in the region of the neck, the posterior portion of the mouth and the pharynx. His temperature was about 102°, with a tendency to go higher except when checked by sponge baths and other treatment. Deglutition was so far interfered with that for a number of days nourishment was given per rectum. During one night the question of respiration became an exceedingly difficult problem.

The real etiologic factor in this case proved to be an infection from a small pus pocket on the distal side of the root of a lower third molar. No recurrence having taken place, the correctness of the diagnosis seems to be conclusively proved.

Case No. IX. This was a case of angioma. The growth was situated in the molar region of the lower jaw of a woman from whose mouth the molars had been extracted some years before. The history of repeated attempts at removal, with prompt recurrence, at first gave color to the belief that the tumor was malignant, until the microscope determined its benign character.

DERMOID CYST OF THE NECK.

Case No. X. This case of dermoid cyst of the neck I have

previously reported in detail, but it is relevant here to complete the present series—inasmuch as the swelling extended into the mouth, displacing the submaxillary gland and the tongue on the affected side in such a manner as to lead one to believe that the gland was involved, which of course was not the case. That this condition might easily be confusing was proved by the fact that an early operation had been performed by some surgeon, who removed more or less tissue from the mouth in the region of the swelling in the belief that he was operating upon the tumor itself, whereas the cyst lay under the jaw and extended for some little distance down upon the side of the neck.

Case No. XI. A man about fifty-five years of age. The patient was brought to me by a dentist in whose care he had been for some time, for what appeared to be a not very serious condition of necrosis in the region of the third molar. A microscopic examination led to the diagnosis of carcinoma. This, although the diagnosis was made when he consulted me, is the only one of all the cases quoted that I did not treat or operate upon, and therefore I cannot give a statement as to the final result.

Case No. XII. A little girl, six years of age. She had not been able to open her jaws from the day of her birth until after operation.

To emphasize the point that it has been my purpose to make throughout this series—that cases difficult to diagnose may often be simplified by taking due notice of some apparently trifling factor—it is necessary to call attention to the fact that, according to the father's statement, about eighteen physicians and surgeons had at different times been consulted with regard to the case. All of them had recognized the self-evident fact of ankylosis, but none had been able to determine whether it was unilateral or bilateral, fibrous or bony.

Some time ago I had the pleasure of calling attention to the diagnostic significance of the central facial line. If you will note the relation of the chin of this child to the central division of the forehead and the nose, it will be apparent that it is quite considerably drawn to one side. This simple fact, in the absence of other means of determining—since the mandible was almost absolutely immovable—led me to the conclusion that the condition was

probably unilateral. A very slight possibility of movement of the jaw under pressure indicated that the interfering structures were fibrous and not bony. Upon these two comparatively insignificant symptoms it was determined to undertake operation from the inside of the mouth with a view to correction without external scar and deformity. How nearly our conclusions were correct is shown by the condition of the patient four weeks after operation, when sufficient time had elapsed to give assurance that there would be no recurrence of adhesions to hamper jaw movement in the future. The child's health improved immediately after it became possible for her to open the mouth, and thus to masticate food in a natural way, together with the effect upon the tonsils of better oxygenation, and upon the tendency to adenoids and enlargement of the lymphatics in the region of the mandible, these being so large as to make a diagnosis still more confusing.

I shall probably describe this case in detail at some future time, but for the present it is of passing interest to note that there was no history of forceps delivery, which is so common where children are born in this condition, though it is a noticeable fact that the mother was twenty-four hours in labor.

I have confined these examples to one region, and have chosen them because of their resemblance to each other—while yet each one has been shown to be distinctly different in character—because it seemed more likely that the simple lessons which these, and other cases in other regions of the mouth, have taught me might be conveyed to others more strongly by reason of the direct simplicity of this form of illustration.

When one hears and reads elaborate and ultra-scientific descriptions of pathologic conditions of the oral cavity and other surgical divisions—as unfortunately he does too frequently—it is often apparent that the actual conditions under consideration are altogether of a different character; in fact, much simpler than one would be led to believe them to be, on account of the fact that both etiology and diagnosis have been mistaken by the narrator. Consequently one cannot help feeling the urgency of any effort possible to be made to convey broadcast the idea that the truest science—whether that of the etiology, pathology and diagnosis of oral diseases, or any other science—is, after all, that which brings the broadest

knowledge nearest to absolute simplicity, and reads in the most trifling signs indications leading the way to correct conclusions and successful results.

DISCUSSION.—*Dr. Wm. Carr,* New York, N. Y.: Case No. I that the essayist reports is of great interest, and it very forcibly demonstrates that the general practitioner should be familiar with the pathologic conditions of the oral cavity, and also shows the importance of establishing a chair of "dental and oral surgery" in every medical school. How often we realize this when patients, supposed to be suffering from facial neuralgia, upon consulting the dentist discover that the case is one of simple pulpitis. An instance of this kind came under my personal observation not long since, as follows:

A young lady had been treated for facial neuralgia for two years by a prominent neurologist of the West without obtaining relief. She was afterward treated for months by a New York surgeon who, after exhausting his remedies, concluded that it might possibly be a case for the dentist. Upon examination I found two pulpless bicuspids upon the affected side, but was convinced that neither of them caused the trouble. I saw that one third molar was lacking, and with difficulty succeeded in passing a pledget of cotton saturated with oil of cloves and chloroform between the gum and the posterior portion of the second molar. After making this application three times the pain, greatly to my astonishment, ceased. The patient said that it was the first relief that she had experienced for more than two years. Finally, by continued treatment, sufficient space was secured to insert a probe—when the impacted third molar was discovered. Although impacted, the tooth was decayed and the pulp was inflamed. The tooth was extracted under anesthesia, and since then the patient has been perfectly comfortable.

In some cases that I have observed diseased teeth caused enlargement of the cervical glands. The patients, under the care of a general practitioner, were dosed with iodids without relief, and the gland having been pronounced tuberculous was removed in each case. Then other glands in the same region having become enlarged, the same course of ineffective treatment was pursued.

In several such cases in my practice speedy recovery ensued upon removal of the diseased teeth or roots.

Case No. III described by Dr. Brown is certainly very interesting. He states that the patient suffered from two distinct classes of symptoms, the first of which he has explained satisfactorily; but the symptom which he describes as reflex pain due to pulp-stones is not so definite. He has not stated whether the pulp-stones were removed or whether the teeth were extracted. It would be very interesting to know which was done.

Now, as to the grinding habit of neurotic patients, as he described, I have seen a number of these cases, and will cite one, that of a school teacher aged twenty-eight, who had the habit of biting her tongue both when awake and asleep. Her tongue became so swollen at intervals that it was incapacitated for use. She was compelled to insert it into a bag or sheath, which caused incessant drooling. She had been treated for a long time with lotions, etc., without benefit. She was referred to me, and after examination I decided that her teeth were the primary cause of the trouble. An impression of the upper and lower dentures was taken. Upon examination of the casts from the posterior aspect, I decided that she bit her tongue with the inner cusps of the upper and lower molars and bicuspids. These were reduced by means of carborundum disks, and a permanent cure was effected.

I congratulate the essayist on the success of his diagnosis and treatment of the ankylosis case. The paper as a whole is instructive from a clinical standpoint, and if practitioners would follow the example of Dr. Brown, the profession at large would be greatly benefited.

Dr. Truman W. Brophy, Chicago, Ill.: Dr. Brown requested me to present, in connection with this paper, some experiences I have recently had in the treatment of actinomycosis, or what is commonly called "lumpy jaw." The history of this disease has been discussed for years, and it has been hitherto presumed that all human subjects that contracted it took it from the bovine family; but it has been shown recently, in the experiments made at the Agricultural School of Wisconsin, that the human family may contract the disease in the same way that cattle do. When actinomycosis or lumpy jaw came under the observation of the

professors in the agricultural school, they sought for a means of effecting a cure, and endeavored to discover the true cause of the disease. They found, on microscopic examination of the discharge forming in the lumpy jaw, that certain pathologic organisms were present. These organisms were isolated, and then, when they extended their investigations farther, they found that the straw of oats chiefly—but the straw of any grain or grasses—develops a disease called "rust." All who have had any experience in this know that oats will grow vigorously and promise to form an abundant growth of grain, and then, just as they reach the developmental stage of heading, this rust will appear on the straw, so that the kernel of the oats fails to mature. It will grow to the point of developing a good-sized head, but the kernel or the oat itself does not develop. The investigators at the agricultural school studied this "rust" microscopically, and found that it yielded precisely the same bacteria that the discharges from the lumpy jaw of cattle contained, and so the germ of actinomycosis was discovered—the origin of the disease. The cattle contracted it from eating the grain upon which this red rust was found. Then the experimental station attempted to destroy the "rust" on the grain by treating the seeds of the oats with a weak solution of copper sulphate. These oats were placed in corn sacks and dipped into great vats in which the solution of about one-fourth of one per cent of copper sulphate was placed. After the seeds had been immersed for twelve hours they were removed and spread out to dry, and it was found that the oats so treated, when planted did not develop this rust—so destructive to the development of the grain.

Then they reasoned that if copper sulphate would destroy the effects of the rust on the oat straw, why would it not destroy the bacteria in cattle affected with this lumpy jaw. Suiting the treatment to the thought, they made applications of the copper sulphate to the sinuses of these cattle, and to their great satisfaction the suppuration began to cease. Then they went farther, and determined to make use of the copper sulphate solution internally. The remedy was administered to the cattle that had contracted the disease, and they recovered. The investigators determined to carry the experiments still farther—that is, to the human family—

and within the last eight or nine months, in the Presbyterian Hospital in Chicago, there have been nine cases of this disease treated by the method employed in the case of the cattle. Copper sulphate in doses of one-eighth of a grain was administered internally four times a day, together with about ten grains of potassium iodid, and the sinuses were irrigated with a weak solution of about one-tenth of one per cent of copper sulphate. All the patients recovered. Now, it is known to you all that so-called lumpy jaw, or actinomycosis, has been regarded as an incurable disease—as much so as carcinoma—until this new treatment was suggested through the experiments of the agricultural school at Wisconsin.

I also spoke to Dr. Brown about an experience suggested to me by an article which appealed to me, published in the *Therapeutic Gazette* about two weeks ago, an article written by Dr. Henry Tucker of Philadelphia on the value of magnesium sulphate as a local application for the control of pain in these cases. So successful was he with this treatment that I was impressed with the article, and finding that I could not, by the means ordinarily resorted to, control the pain in a patient who came to me about two weeks ago, I decided to make use of the treatment that Dr. Tucker suggested, and which he had carried out so successfully. I made a hot saturated solution of magnesium sulphate, and applied it on folds of gauze—about six or eight thicknesses—over the face of the patient, covering that with oiled silk; upon that were placed several thicknesses of flannel, and then the hot-water bag, so as to keep the face constantly warm in order to get the benefit of the heat, together with that of the magnesium sulphate. The first five hours after the application was made there seemed to be no apparent change in the degree of pain, but after it had been applied for eight hours the pain disappeared permanently. Previous to the hot applications hypodermic injections of morphin had been made, but these were discontinued, as the patient was now thoroughly comfortable.

I may state that this patient was a dentist, who, upon returning from a hunting trip, began to develop pain in the side of his face. He came to me for consultation, and I asked him if he had been in contact with any cattle during his trip, and he said he had not. But he admitted that he had been in a house in which there was

a lot of straw, and being in the habit of chewing straws occasionally, as many men do, he had chewed some of this straw, and so had contracted the disease. Now, after applying to this case the treatment already mentioned, the man is getting well, and I am satisfied that notwithstanding the fact that the sinuses are very deep—from the top of his head to the mammary glands—the disease is abating and some of the sinuses have already completely healed. Professor Bevan, who is president of the Section on Anatomy of the American Medical Association, has successfully treated a number of cases, and largely through his help and the information I gained from him regarding the value of the copper sulphate treatment, I have been able to successfully manage several patients affected with this disease. Professor Bevan is the first surgeon to have successfully treated actinomycosis with copper sulphate. And so today this dreaded disease, that has been equally as dreaded and often more distressing than the most malignant form of cancer, is amenable to successful treatment.

I will not detain you longer on this most interesting subject, but in conclusion I want to say that the paper read by Dr. Brown this evening has impressed me as one of the best he has ever read, and I have heard many of his papers. It is a good paper, because so much is brought out on different lines, and shows the value of developing in a higher degree the study of oral surgery in colleges of dentistry; for if we depend on the schools of medicine throughout the country for knowledge on these subjects we shall meet with the sorest disappointment, as they do not teach them.—*Dental Cosmos.*

PYORRHEA—THE SUBDUING, THE PREVENTION, THE TREATMENT, FROM THE STANDPOINT OF AN AMATEUR. By J. P. Root, D.D.S., Kansas City, Mo. The question of the subduing and the prevention of pyorrhea was forced upon me in several ways, the apparent increase (at least among my patients) of this disease, the lack of knowledge on my part regarding its treatment, the criticisms on the part of my patients as to my inability or willingness to cope with it, fairly forced me to at least attempt to give my patients the attention they deserved. My short experience as an "Amateur Pyorrhea Specialist"

leads me to take issue with some of the so-called experts, regarding their treatment.

The question as to whether pyorrhea is a local or constitutional disease, whether it is infectious, contagious or hereditary, will not be considered, whether some peculiar brand of bacteria causes the trouble is immaterial as far as this paper is concerned. Too many men are writing on this subject, advancing mysterious theories they cannot prove nor we disprove; the question to be considered is, What are we going to do about it?

Pyorrhea specialists say it can be cured; the advertising cancer specialist says he can cure cancers. Can he? The pyorrhea specialist says he can cure pyorrhea. Can he? So can I, but it depends entirely upon what you term pyorrhea. The resulting inflammation from deposits of salivary calculus cannot ordinarily be so classed, or should not be, yet the large per cent of cases our specialists cure are from this cause, and they term it pyorrhea, but when in argument admit it is "incipient pyorrhea," a distinction similar to classing a "cold on the lungs" as consumption. I will admit, if the trouble was not eradicated, it might develop into pyorrhea, yet only in a small per cent of cases, the same as a pimple may become a boil, and for gently squeezing a dainty little pimple you are not entitled to the credit or fee for curing a boil.

In so-called "incipient pyorrhea" all required is the thorough removal of deposits, polishing of all surfaces, advice pertaining to future care, and "incipient pyorrhea" is cured.

But with the "real thing," when teeth are loose and sore, gums receded, deep pockets between teeth, filled with pus, then you can drop the favorite word, "incipient," and tell your patients they have the dreaded disease, which you can subdue and control, but not cure, providing they will follow your instructions regarding present and future treatment, especially future. I am not making an idle assertion with the idea of provoking unnecessary discussion; my statement is one I honestly believe is true, regardless of the opinions of any and all pyorrhea specialists, and for several years I have watched theirs and my own treatment. I have studied the practical side of the question. I have made many inquiries from dentists and patients, and I find that in most cases, where failure resulted, the excuse was, "The patient did not

follow advice pertaining to future treatment." It is not strange that such should be the case, when the patient was dismissed with instructions for home treatment and the final advice to drop in some time within six months or a year to be touched up. Experience demonstrates that in the greater per cent of such cases failure follows, for patients will not follow advice, and if they did there would still be failures, unless the Lord took care of the cases, and observation leads me to believe that the only interest He takes in dentistry is to care for imperfect root canal fillings. There is not an original idea of mine in the system I follow, it is merely the compiling of the ideas of others.

Primarily I try to instill into my patients the dangers of neglect, what the results will be unless my advice is followed. I emphasize the fact that while (perhaps) others may cure, I cannot. My aim is to subdue and control, and this cannot be done unless my instructions are faithfully followed, and if they do not feel like doing so I advise no treatment.

The instructions are the kind of a toothbrush to use; its proper use, illustrated with a brush and a typodont form; advice regarding powder and mouth washes; the virtue of massaging the gums night and morning, and where pockets existed and the recession of gums is extensive, the daily use of a metal syringe, forcing hot water through the approximal spaces. The last advice given is, if I am to control the disease, they must come to me at stated intervals, never to exceed sixty days, and to insure their attendance I mail them a notice reading:

Kansas City, Mo.

.....19....

M.....

In accordance with your request, I beg to notify you that your teeth need attention at this date.

Yours,

This is supposed to be at their request, and only one notice will be sent. Before anyone in discussion can say—you cannot get them to come, or they do not desire to be constantly "puddling" around their patients, I will admit that they will not all come, but a goodly per cent will, and as for having your patients visit you frequently, I find it is desirable, for their comfort is retained, and

their visits are paid for, the charge being, as all such treatments should be, on a time basis.

My short experience in treating pyorrhea leads me to believe many patients refrain from being cared for through fear. They have been treated once, or had friends who were tortured, and unnecessarily so, and their fear kept them away. The pain in many instances is severe and cannot be eliminated, but with the proper preliminary treatment, with proper instrumentation with the proper instruments, a great deal of pain can be avoided. Here is where the objection to "puddling" comes in again; by puddling I mean what might be termed dallying, short engagements, etc., when at first perhaps very little more is done than to relieve the patient's mind regarding pain. The preliminary treatment varies according to existing conditions of the mouth as well as the mental conditions of the patient. By mental I mean their dread of possible pain.

In most cases thirty minutes is the limit of time for each appointment, never over one hour. The first few treatments are devoted to the removal of superficial deposits, the thorough cleansing and polishing of the coronal portions of teeth, the massaging of gums with rubber disks, all this accompanied with the lavish use of hot medicaments to pockets, either with a syringe or compressed air.

When the entire oral cavity has been placed in a more healthy condition, you will find the dread of the patient largely eliminated, the congestion of gum tissue greatly improved; all conditions are such that your patients will be more comfortable and your work far easier.

The removal of the deposits from the roots requires proper instruments, and the ability to use them. It is the man behind the instruments who is largely responsible for success or failure, but for success it must be a combination of ability and proper instruments and their proper use.

In the selection of instruments there can be no set rule. What may be suitable for me may not be for you; in my case I find by selecting a few from sets of different men I can obtain an assortment suitable for my use. I also find what suits me today may not tomorrow.

The important result is not how you removed the deposits, but

the fact you did it with the least possible laceration of tooth structure or surrounding tissue.

As far as possible there must be no guesswork regarding the instrumentation. Begin at some definite point, take two or three teeth at each sitting, and finish before touching others, and once finished leave alone for nature to take care of (that is the portion of the tooth below gum margin). The coronal portion should be thoroughly cleansed and massaged at each subsequent sitting, using pumice and chalk, with orangewood sticks, rubber cups, etc., also giving the gums a massaging; for this purpose use rubber cups; this is, in my opinion, an important feature, as the congested condition of gums which generally exists is relieved, also at these subsequent sittings use any medications you deem best, but as for therapeutical treatment, nine-tenths should be what I term "mechanical therapeutics," which is simply cleanliness.

It may be my misfortune because I have never seen a case of pyorrhea where the disease was extensive, where a cure was perfected. (Of course we differ greatly as to what is termed a cure.) Yet some may be able to perfect a perfect cure, I am not, and I tell my patients so. I also inform them of the fact that others claim they cure, and give them the advice to seek their aid, which they do not, for I believe after describing what pyorrhea is (that is, so far as I am able) and giving my reasons for failure to cure, also reasons for subduing and controlling, they seem to believe my practice the correct one.

Why do I not effect a cure? To do so all deposits must be removed, and absolutely so, all surfaces must be polished, and in bifurcated teeth such results are impossible.

The word I use to describe desired and expected results is subdue. I tell them I can subdue the disease and place the mouth in a comfortable condition, and then with emphasis, impress upon them such conditions can be retained by following my advice regarding future treatment at the office and at home.

Some of my friends say, "I cannot puddle in this manner. I do not want my patients constantly coming to my office; every six months is often enough for me to see them, and then if they have obeyed my instructions they will be cured." Possibly this is so, but there is the big if, as I find in the majority of cases

my instructions, either through ignorance or carelessness, have not been followed, and these frequent visits give me the opportunity of rectifying any wrong.—*Western Dental Journal.*

METHODS OF AVOIDING UNNECESSARY DISPLAY OF GOLD IN BRIDGEWORK. By W. A. Giffen, D.D.S., Detroit, Mich. Assuming that bridgework attached by crowns to the abutments is indicated and that the therapeutic or surgical treatment has been done that may be necessary to correct or arrest all pathologic lesions which may affect the teeth or roots to be used as abutments, including root canals and surrounding tissues, the next step is to carefully fill the canals and trim or shape the roots.

All remaining portions of the natural crowns should be excised on a level with the highest approximating gum festoon. The basal surface of the root should now be beveled with a flat edge carborundum stone or root facer lingually and labially or buccally almost to the gum margin, with the exception that the lingual edge of the upper anterior teeth should be left longer than the labial in order to afford the greater mechanical resistance to the stress naturally imposed. The ledge of enamel remaining should be trimmed away and the periphery of the root tapered all around except at the labial or buccal portion, which should simply be straightened. As much care should be exercised in doing this work as in the preparation of a compound cavity for an inlay.

An impression is now taken of the end of the root and a metal model made, a piece of forty-gauge platinum large enough to make a hood for the root is then swaged over the metal model. The lingual and approximal portions of the collar being trimmed the desired length and the labial portion trimmed as short as possible, the cap is reswaged. The root canal should now be enlarged and the post fitted. The post should be made of four-sided iridioplatinum wire of a gauge proportionate with the size of the root. It should be tapered at the point and flattened mesiodistally and should not be longer than the crown it is to anchor. I can see no necessity for using a longer post.

The canal should be reamed out just large enough to accommodate the post and so that the end will be tightly fitted into the canal. As a rule the directions of the canals should be followed in order to best preserve the strength of the root, except perhaps

the upper anterior teeth when I think it best to enlarge the canals towards the lingual surface. In all cases, where roots to be used as abutments, are not parallel with each other it is necessary to enlarge the canals laterally to overcome the divergence or convergence as the case may be.

The labial portion of the basal surface of the root should now be shortened below the gingival line, the platinum hood adjusted by burnishing where necessary, punch small hole through hood into canal, push the post into place, remove and solder with platinum solder. In order to be sure that it fits right I replace on root and reburnish or swage, then invest and flow gold over the basal surface of the cap and collar to stiffen it, after which it should be filed and polished. The completed hoods are now placed on the abutments and an impression of the alveolar ridge taken with Perfection impression material as hard as you can use it without hurting the patient. A model is made, and about the thickness of thin cardboard scraped off the ridge between the abutments. Take a piece of forty-gauge platinum large enough to cover the ridge and long enough to reach the abutments, burnish or swage it to fit and reinforce it by soldering a strip of twenty-eight-gauge platinum along the lingual edge of the saddle. Replace the hoods on abutments and place the saddle in position, take another impression with Perfection material stiff enough to force the saddle up tight against the ridge, coat the inside of hoods and saddle with whiting, invest and solder abutments and saddle together.

The completed foundation is now cleaned, enough guttapercha placed in the root canals to hold it, the posts warmed and placed in position. Impressions and models are again made and articulated on an anatomic articulator and we are ready to grind and fit the artificial teeth to the foundation. A strip of thirty-gauge tin should be burnished and waxed to the saddle to allow for the thickness of gold used in making the hoods for the base of the crowns.

The cervical ends of the crowns should be ground to fit the saddle at the labial or buccal edges, while the lingual portions should be shortened to allow for reinforcement.

The periphery of the cervical end of each crown should be ground away around the lingual edge enough to allow the hood to cover it at least one-eighth of an inch, and as far labially as

the post hole in the crown. Any of the ready-made porcelain crowns can be used in this way. Personally I like the Whiteside crowns made for bridgework the best, for the reason that the cervical end is made to conform to the general shape of the alveolar ridge, being considerably longer at the labial edge. Again, the post hole is closer to the labial portion allowing greater depth for the hole in the crown, also leaving a greater body of porcelain in the lingual portion to allow for more grinding so you can use a narrow saddle and still have room for whatever reinforcement is necessary. I don't know any reason why this crown is not as good as any other, except, perhaps, for the limited variety of shades.

After the crowns are fitted and the portions that have been ground are polished, posts of iridioplatinum should be made to fit holes in crowns. To make hoods for base of crowns invest on dental lac with cervical end exposed, place post in the crown, take piece of thirty-two gauge, twenty-four karat gold plate and punch a small hole in it, place over base of crown, forcing exposed end of post through hole in the gold and swage to place, remove and solder post and trim collar short as possible labially and as long as you can use it lingually, then reswage and burnish to place. The hood should fit snugly and still be easily withdrawn from the crown. The ends of the posts on basal surface of hoods should be ground off. Now strip off tin from saddle and abutments, place crowns in position waxing hoods to the foundation, remove the porcelains and complete the waxing process, and then invest and solder from the lingual side. In finishing the bridge, cut surplus platinum from the saddle close to the edge of the crowns on the labial side with knife-edged carborundum stones and then round off the metal edge and polish.

The saddle should extend lingually just enough to allow for sufficient reinforcement and contour.

This style of bridge I consider practical and applicable for either upper or lower and for as many teeth as necessary, provided you have abutments in the proper locations to carry it.

I use platinum for the saddle as it withstands the chemical action of the secretions so much better than gold as to rank, first in compatibility with the tissues which take most kindly to it, and while it fits closely to the tissue, it does not press hard enough to

cause a protracted lack of blood supply. The alveolar ridge is protected and very little, if any, absorption takes place under the saddle.

A bridge constructed in this way feels agreeable to the tongue and lips; besides, it is the cleanest fixed bridge made, as no particles of dirt can get under it, and even the cells exfoliated by the epithelium are taken care of by the tissues, and the exposed surfaces of the bridge can be kept clean as easily as natural teeth. The saddle also acts as a matrix to keep the solder where you want it exactly and allows you to utilize nearly all the space between the ridge and occluding teeth for porcelain so that the bite must be extremely short to prevent the use of this style of bridge. Another point in favor of the saddle is that it acts as a stay to keep the abutment attachments in perfect position while soldering the case.

In using porcelain facings in place of crowns I prepare the abutments and hoods in the same way, use gold for backing the facings and grind the cervical end of facing to fit the labial edge of ridge, no saddle being required. I have used the Steele detachable facings occasionally for about two years, and I must say they are proving very satisfactory. I have had a few of them crack off, however. I may have trimmed the backings a little too short. The most discouraging feature about the Steele facings is the limited variety of shades and molds to select them.

The natural crowns of teeth should only be used as supports for bridgework when their condition and appearance are suitable. After filling root canals, cut cavity from canal to surface of tooth approximating space to be bridged. The labial wall should be straight, the lingual and gingival walls flaring outward or away from labial and axial walls. Burnish platinum matrix to the outer cavity and then ream out root canal and fit iridioplatinum post. Use a post long enough to bend in the shape of an L, so that when one part of post is in the canal, the other will rest on floor of cavity and protrude from same far enough to reach hood or backing of the approximating dummy tooth of bridge. The matrix should now be placed in cavity, the post placed in position and soldered slightly to the matrix. Replace in tooth and reburnish margins, then invest and finish. This combination of post and inlay can be made for any tooth.

I like the staple crown for anchoring short bridges to teeth with healthy pulps better than any other form of partial cap. I make a plaster model of the lingual and approximal surfaces of the tooth and take a piece of forty gauge twenty-four karat gold plate large enough to cover model and punch four or five holes in the center of it and burnish over the model. I now prepare the tooth in the usual way, using very thin platinum for the matrix. When staple and matrix are completed dry surface of tooth, smear a little vaselin over the surface, replace matrix and press a warm pellet of Peeso's wax over lingual surface of matrix. Now warm the gold hood which was swaged over metal model, place it over wax, gently press it to place, burnish margins which should overlap all joints. Remove from tooth, clean inner surface, coat it with whiting and insert, including margin. Now burn out the wax and fill the space between the two layers of metal with solder through the hole in the lingual surface of the outer layer. This style of cap is very strong, which, of course, is the most essential requirement. A hood or shoe made in this way and anchored to the lingual surface of teeth with small pins instead of the staple, can be used to good advantage in some cases, if the work is done well.

Inlays or fillings do not make reliable attachments, except perhaps in molars and upper bicuspids; however, they are valuable when utilized as rests in the form of spurs or lugs on extended or continued and removable bridges.

The indications for removable bridgework summed up briefly are:

(1) In all cases where either fixed or removable bridgework is indicated, patients who will appreciate its artistic and hygienic properties sufficiently to take care of it.

(2) The loss of single bicuspids and molars and where the adjoining teeth are sound.

(3) Where the abutment teeth or roots are not in position to support fixed bridgework.

(4) Cases where there has been extensive resorption or loss of tissue.

The loss of a single molar forms a class of cases which I think is sadly neglected. The patient is apt to feel that the loss of one tooth is not of much importance, and many dentists treat the con-

dition in the same way. If we would just stop and consider how many deformed jaws, and how many cases of malocclusion result from the loss of a single first molar, or even a bicuspid in young patients, we should do better work.

I have bridged in a few single molars which are very satisfactory in the following way: Select suitable tooth to fill space, make groove on approximal surfaces of the teeth approximating the space to carry eighteen gauge iridioplatinum wire. Now make hood for base of crown and short saddle for alveolar ridge and wax them together in proper positions. Cut the wire support long enough to reach from saddle through the groove and form a lug or spur to rest in the slot in the fillings or inlay of approximating teeth, and wax the ends to saddle, remove porcelain dummy tooth, invest and solder. When they are fitted properly they go to place with a click and are surprisingly solid. If the ridge is flat and you are afraid the dummy will rock, solder a clasp to the wire on distal surface long enough to clutch the mesiobuccal and mesiolingual angles of the approximating molar.

Porcelain bridgework is an ideal type of prosthesis when practicable. The two great reasons why it is not more universally used being—

(1) Porcelain is a vitreous and friable substance and as it has always been deemed necessary to fuse it to trusses and bars of various designs in order to make a bridge, thus destroying the integrity of the porcelain to the extent that it will not stand the stress it necessarily must undergo in the mouth, unless you can use a large bulk.

(2) The difficulty of repair.

I firmly believe I have overcome both of these difficulties by the combination of a saddle, a matrix and cement, the only difference between a fixed or removable bridge being in the attachments. Prepare the foundation for the bridge as described in the first part of this paper, then reinforce saddle on the lingual side of ridge with strips of iridioplatinum to make it stiff, trim lingual edge and solder strip of clasp gold on edge against it and around lingual edge of hoods, using a strip wide enough to leave the upper edge free, or so that it will form a ledge to finish against and protect the porcelain.

Select Davis crowns to suit the case, having some part of the labial portion of the base resting on the saddle. Make iridioplatinum posts of round wire the same gauge as the ordinary Davis post and grind one end of post to fit the saddle, wax all posts in place and solder. Now take a piece of thin platinum large enough to cover entire saddle and abutments, punch holes for posts a little larger than the posts, make tubes of inlay platinum large enough to fit over posts and solder in the holes in large piece of platinum. Place over saddle and burnish carefully all over surface; when completely burnished, gently squeeze matrix tubes to posts, place crowns in position and remove from saddle and invest the under surface of the matrix with Pelton's investment and dry slowly, but thoroughly, build porcelain under and around edges of crowns and biscuit. Then add more porcelain and bake again, but it is well after the first bake to try on saddle to be sure the crowns are in place and to reburnish margins if necessary. When the baking has been completed strip off the matrix and it is ready to be cemented to saddle.

In cases where there has been extensive loss of tissue, carry saddle as high labially or buccally as necessary and wire the edge the same as a continuous gum plate, make matrix in the same way. Build up and carve your porcelain to represent gums and finish or tint with gum enamel; of course, such a bridge should be made removable. In case of fracture, dissolve cement, make a matrix, replace broken parts on matrix and mend with new porcelain.

I have used this method in making a matrix to fit an individual Davis crown for about two years, or ever since Dr. Thompson demonstrated its use at one of our annual meetings. I got the idea of cementing a number of teeth in one block to a saddle from Dr. Kreit, who uses it for making partial lower porcelain bridges on a Watt's metal base.—*Dental Register.*

ON CERTAIN REFLEX OCULAR DISTURBANCES OF DENTAL ORIGIN. By Dr. A. Beauvois, Paris, France. Notwithstanding the intimate anatomic relationship existing between the eye and the teeth, no treatise on ophthalmology so far published contains a chapter devoted to the study of ocular disturbances the result of pathologic phenomena about the teeth and oral mucous

membrane. Apart from the direct communication between the orbit and the maxillary sinus by means of the periosteum, and the thinness of the upper wall of the maxillary sinus, which corresponds to the floor of the orbit, the eye and the teeth are still more closely related through the venous and nervous systems.

The veins play the most important role in the transmission of infection, and in this connection it is of importance to recall that the labial and coronary venous plexuses and the angular and facial veins empty in the ophthalmic, which in turn empties in the coronary sinus. The nerve relationship between the organs under consideration may be traced as follows: The Gasserian ganglion gives off three branches, the ophthalmic, the superior maxillary, and the inferior maxillary. The ophthalmic nerve is joined by filaments from the cavernous plexus of the sympathetic, and communicates with the third, fourth and sixth nerves, and divides into three branches, the lacrymal, frontal and nasal. The terminations of these nerves go to supply the scalp, part of the integument of the forehead, the upper eyelid and side of the nose, the palpebral conjunctiva, the bulbar conjunctiva, the laryngeal mucous membrane, with that of the frontal sinus, and the lacrymal and Meibomian glands. In addition, the ophthalmic branch sends filaments to the periosteum and osseous tissue and branches of communication to the orbital branch of the superior maxillary nerve. Furthermore, the ophthalmic nerve through its nasal branch is in direct communication with the ophthalmic ganglion, which sends several small filaments—the ciliary filaments—to the iris, and one to the retina.

The superior maxillary nerve supplies the upper teeth and the skin and mucous membrane of the upper lip. Another important branch of this nerve, from the standpoint of the subject under consideration, is the orbital, by reason of the anastomosis of its temporal branch with the lacrymal branch of the ophthalmic. Also, the branches of distribution of the temporal branch of the orbital communicate with the facial and auriculotemporal branches of the inferior maxillary nerve, and those of the malar branch, after supplying the skin on the prominence of the cheek, join with the facial and palpebral branches of the superior maxillary. The temporal and malar branches of the orbital, in addition, anastomose with the temporal and malar branches of the facial nerve.

It will be seen that the teeth, although intimately related to the conjunctiva, lids, lacrymal gland and iris, through the trifacial nerve, could not induce pathologic changes in the deeper ocular structures, except through the blood vessels, the maxillary sinus, or by the spreading of a periostitis. Ocular disturbances of dental origin may therefore be properly divided into two kinds: Those affecting the anterior segment of the eye, supplied by the trifacial, and those affecting the posterior segment. The former are more frequent than the latter. The disturbances affecting the anterior segment are lacrymation, conjunctivitis, paralysis of accommodation, neuralgia and blepharospasm. Simple lacrymation—that is to say, the variety not accompanied by inflammation or suppuration of the lacrymal canal or sac—is frequently encountered. In such cases an examination of the conjunctiva shows that the membrane is but slightly inflamed, if at all, and that the lacrymal canal is unobstructed. The disturbance in such cases is therefore due to hypersecretion of the gland, which may be caused by a variety of factors—diseases of the teeth among them. This pathologic possibility was long ago pointed out by Galezowski and his pupils, Mangin, Despagnet and Abadie, the latter of whom reported a number of such instances. A case that came under the author's own observation was that of a man, aged thirty-six years, who at the age of thirteen years received a violent blow on the nose. It resulted in deviation of the septum, with deformity of the nasal canal. However, contrary to what occurs in traumatisms of this nature, the patient did not suffer from lacrymation. At the age of thirty-four, on account of severe toothache, he had the first molar and one of the incisors on the deviated side extracted. A month afterward lacrymation appeared, although the canal was not stenosed. This phenomenon of reflex irritation can be explained by remembering that the superior maxillary and ophthalmic divisions of the fifth cranial nerve communicate with one another, the orbital sending a branch to the lacrymal gland and communicating with the lacrymal branch of the ophthalmic.

Another case was that of a young woman, eighteen years of age, who complained of periorbital neuralgia, pain on reading, and lacrymation. An examination of the lacrymal canal on the affected side revealed no abnormality whatsoever. The refraction test showed that the eye on the affected side was emmetropic, although there was

slight diminution in the power of accommodation. For distances the visual acuteness was normal. Diagnosing the case as one of asthenopia of accommodation with lacrymation, the author prescribed visual rest, the use of smoked glasses, and internally small doses of quinin salicylate. A few days afterward the patient reported slight visual improvement, but persistence of the lacrymation. An injection was then made through the lacrymal canal, and the fluid escaping through the nasal fossæ showed that there was no obstruction in the canal. It was at this time that the author decided to dilate the opening of the lacrymal canal, but in attempting to do so he accidentally discovered that the roots of the upper second and third molars on the affected side were very painful, and at once refrained from carrying out the proposed intervention. He thereupon questioned the patient regarding the two molars, and ascertained that from the time gold fillings were inserted in them the roots had been so painful to pressure as to prevent her from using the molars during mastication. Dr. Beauvois at once directed her to consult a dentist. The gold fillings were removed and the root canals antiseptically treated. Two months afterward, when her teeth were again in a healthy condition, the trouble in the eye and lacrymal gland had entirely disappeared. Lacrymation, when persisting for a more or less prolonged period of time, may bring about such severe complications as conjunctivitis, blepharitis, ulcer of the cornea, and keratitis, as a rule, very difficult to subdue.

Years ago Galezowski called attention to a considerable number of cases of conjunctivitis, keratitis and phlyctenula in children, caused by irritation from the teeth directly, or indirectly, by disturbing the vital balance of the affected parts.

Strabismus is also in some cases due to dental disturbances. Javal, in 1866, wrote concerning the subject as follows: "Convergent intermittent strabismus, or to state it more accurately, the variable type of hypermetropia in young adolescents, or young children who scarcely squint ordinarily, but who upon experiencing an emotion of any kind or unduly exercising their eyes, or upon being subjected to nervous excitement, or suffering from some general disorder induced by dentition or any other cause, show a shocking deviation, and occasionally a sort of chorea of the muscles of the eye, which causes much anxiety to the parents." Javal thinks

that a large number of cases of convergent strabismus are caused by a temporary paralysis of accommodation, and as Schmidt, on the other hand, has demonstrated that paralysis of accommodation is a frequent complication of dental disorders, strabismus may indirectly be caused by pathologic conditions about the teeth.

If the frequency of strabismus and the large number of observations recorded in our clinics are considered, one could not but feel astounded that the dental phase of the etiology of that disturbance should not, as yet, have become a definite pathologic entity. The cause is doubtless the result of negligence on the part of observers, and of lack of knowledge in the past, concerning the relationship between the ophthalmic and dental regions. At the present time, however, paralysis of accommodation of dental origin is properly recognized. Schmidt has observed seventy-three cases of diminution of the amplitude of accommodation in twenty-two cases of dental disease, and Parker has found that strabismus is more common after disease of the upper teeth. In isolated instances, instead of paralysis of accommodation, contraction of the ciliary muscles ensues.

Mydriasis with paralysis of accommodation is another ocular reflex often traceable to such dental diseases as gingivitis, caries, periostitis, or to extractions. It is not infrequent that patients so affected are informed that the trouble is due to a lesion of the ophthalmic nerve, when in reality the cause is by far less serious. Caries or pericementitis may produce a mydriasis, which will disappear upon the removal of the cause. Desmarres has recorded several observations, and Galezowski invariably attached considerable importance to the examination of the teeth in cases of mydriasis without alteration of the fundus oculi. A badly inserted filling, the presence of caries, or the extraction of a tooth are often sufficient individually to induce mydriasis.

On the other hand, diseases of the eye may induce mental disorders, which persist until the primary affection is relieved or cured. Javal cites a case of glaucoma which caused intense dental neuralgia, and Galezowski, a case of rheumatic iritis which gave rise to toothache of such intensity that two teeth were unnecessarily sacrificed in the endeavor to relieve the patient.—*Dental Cosmos.*

EXTRAORDINARY AND EMERGENT OPERATIONS. By R. B. Tuller, D.D.S., Chicago. Many and many are the occasions where a dentist must be an inventor and devise ways and means to accomplish certain things not described in any text books, nor taught by any precedent. In fact, as no two mouths are just alike, nor conditions the same, there is something possibly in every operation that calls forth some effort not quite like any preceding experience, and often widely differing, and, therefore, such operations are extraordinary.

There are a certain class of emergencies that an operator should be pretty well prepared for, but there are, of course, others that one could not be fully prepared for; that is, to be able to afford prompt remedy except, possibly, in a temporary makeshift.

Some of my own personal experiences may be of value. Early in my practice I was called upon about two o'clock one morning by a frightened M. D. to see if I could stop a case of hemorrhage that was just ebbing away the life of a young lady about twenty years of age. Early in the evening she had gone to this physician to have a lower bicuspid extracted, as the doctor lived just across the street, and the family thought he probably knew as much or more than a dentist about extracting; and they also did not place much value on the tooth. The physician did not hesitate to take the case, and he promptly broke off the tooth. He then went after the root, just how I do not know, but he succeeded in badly shattering the process and wounding the inferior dental artery or a small branch. This was not apparent at first, and, in fact, not until the young lady had retired. They sent over for the doctor, and he realized that arterial blood was flowing pretty freely. He immediately got a piece of leather and scraped a handful of leather shavings. He put a wad of these, about the size of an English walnut, in that side of her mouth and had her close her teeth on it.

As this had little effect in checking the flow, he saturated this bolus plentifully with iron subsulphate, and when this failed and the young lady was going pretty fast, he came rushing after me. While I hurriedly got on my clothes and selected some things needed he gave me a history of the case.

When I got into the room the young lady had fainted, and while the doctor applied restoratives I removed all that leather, located

the place where the tooth had been taken out, made a cone of cotton to go down into the socket and, knowing nothing better and having nothing better, I saturated the cotton with the iron subsulphate. This I forced into the wound and held it with my finger, my thumb making a firm grip under the jaw. In a moment I realized that the flow was checked, and, still maintaining my grip, I syringed out the mouth several times, with the result that after a little the water was quite clear. I then simply sat and held down the cotton for two hours, fearing to take off the pressure. By that time the face, that had become as white as snow, began to take on color and sleep ensued. Before leaving I put in a ball of cotton on top of the plug, closed the jaws on it and tied it up very firmly with a handkerchief over top of head. This remained until the middle of the day following, but the plug was retained in place much longer. There was no recurrence of hemorrhage.

In a small place the incident and narrow escape was soon known and was worth much to me in establishing confidence in my ability, though the M. D. did not take too much trouble to give me credit. He said that I used the same remedy as himself, but I happened to get it on the right spot. He had the "remedy" all over the mouth, making the mucous membrane look like black tanned leather, withered and puckered, and more like a leather purse than a mouth.

A few years ago a boy of about thirteen came to me within three minutes after having a central incisor knocked squarely off, accidentally, with a "shinny" stick in the hands of a playmate. I found the pulp protruding from the stump and entirely benumbed by the shock, so that I had it out on a broach in a moment, with no pain, and an antiseptic dressing adjusted. Then the boy began to dread facing his mother with a front tooth gone. He knew she would have a fit, he said, and asked if I could not put one on immediately. In my own mind I had determined on making the repair with a Logan crown, but I did not have one in stock that would answer at all. I found, however, a rubber-pinned tooth that was a perfect match. To this I soldered a pin with soft solder, and with gutta-percha I adjusted it to the root so that it was not a bit noticeable, and the boy passed inspection at home until he had an opportunity to break the unfortunate news without too much shock to his family. A few days later a Logan was adjusted; that boy (now a married man) says it is so like his own teeth that he cannot observe any

difference. Not yet has there been recession of the surrounding gum enough to expose the joining, and it has a perfectly normal appearance.

The use of a facing or rubber tooth may frequently be made to do service temporarily by soldering on, with soft solder, a bit of German silver wire. Shape this pin to fit pretty snugly, so that it may stay in root without guttapercha, using the latter, however, to fill up space and give a comfortable feeling to the tongue by molding nicely lingually and remove surplus that might be annoying in feeling or appearance. Such a temporary crown has been worn a week or two with comfort and satisfaction. Even on roots that I am treating I frequently adjust such a crown, or, since replaceable crowns are to be had so easily where one is near a supply house, if he has not one in stock, I use those in preference, removing easily as often as needed for treatment. People generally, and particularly ladies, dislike very much to be seen with a tooth missing when it can be obviated, whether it be a natural tooth just extracted or a broken plate or bridge tooth.

Our patients are sometimes inventive, and some years ago a lady taught me that a bit of gum mastic may be effectively used to hide a defect or space temporarily and for appearance sake. Where a bridge tooth had broken off she had attached the mastic, molding it into the semblance of a tooth so nicely that a casual observer would note no defect. Of course this would not last through any attempt at mastication, but in white guttapercha we have a tough enough substance, if firmly attached, to stand some wear. This substance, however, has no such translucent appearance as mastic.

For appearance sake I know of a diatoric tooth being used once to temporarily fill the space where a bicuspid root that held a crown had split and had to be extracted. Utilizing the holes, the diatoric was swung into place with ligatures (or a wire), attaching it to adjoining teeth. It held the place until it was convenient to make the substantial repair.

Recently a lady came to me with a bridge which carried the incisors and was swung by slipper bands on the cuspids, which had always been objectionable in appearance, and at length decay at the necks of the cuspids made removal necessary.

The problem was to remove the old and adjust a new bridge with Richmond crown supports without "my lady" appearing out-

side my office at any time without teeth. This is the way it was done:

First, the pulps of the two cuspids were removed by opening directly in axial line and the use of cocain hydrochlorid. Later the roots were filled at the apical ends, then with a small bur the teeth were cut off at the gum line, thus taking away the bridge with the two cuspids in their bands. Into these cuspid crowns wires were inserted which served as dowels. The work of shaping roots and fitting caps and pins was then proceeded with, and impression and bite taken, as usual.

Before dismissing the patient the old bridge was set back in place by using guttapercha, and was used as well as ever until the next sitting, and again during another interval, without members of the family (the children) observing any change. When the new bridge was ready the change was made, the only thing noticeable to familiars or acquaintances thereafter being a very much improved appearance, but at no time had she to go without teeth.

In other cases a temporary plate may be made to do duty for a few days. In some instances a plate of guttapercha may be made. If of vulcanite, the impression is taken before removing any teeth, and they are then broken off the plaster cast, enabling the operator to have a plate ready to put in as soon as the others are out of the way.

In one instance a lateral incisor that had carried a Logan crown for years split and then became abscessed. The root fragments were removed, a guttapercha plate was made with a reinforcement of thin perforated aluminum, which permitted of shaping approximately well by hand, and this gave considerable rigidity; guttapercha was molded on either side. This eventually was fitted to the roof of the mouth by simply warming and pressing up with the fingers. A long pinned tooth with pins bent to make it hold was then adjusted in its place and as soon as ordinary temperature was reached, it was a fairly rigid and a serviceable plate, good for several days, when with a Carmichael attachment on the adjoining cuspid a dummy was swung in with no exposure of gold from ordinary observation.

In some cases of root splitting, the fracture comes out at the side well up under the gum, but still leaving the rest of root good and healthy, crippled only by lack of a means to suitably attach a crown.

There are cases when a side split off may be built up with amalgam if anchorage can be maintained. In other cases a band may be so fitted as to draw the broken part tight up to place and held there so firmly that a crown may be fitted.

In other cases where the split-off piece is gone, a band nicely adjusted may hold amalgam, first adjusting a bit of waxed wooden toothpick in the root canal protruding far enough to extend a little beyond the packed amalgam to give something to pull it out by after the amalgam has hardened. A hole may thus be left through the amalgam up into the root, through which it may be medicated, if need be, and all ready for a dowel pin in adjusting a porcelain crown.

Since Dr. W. H. Taggart disclosed to the profession how to cast gold, that metal or any other suitable for the mouth that can be cast satisfactorily may be utilized to make a restoration of the broken or decayed roots so that a porcelain crown may be satisfactorily adjusted. Low fusing metal may be used, cast from a wax model fitting with accuracy every inequality. These cast fittings, of course, are to be cemented, and when of gold may be a part of the crown, instead of being a separate base, all going on in one piece.—*American Dental Journal.*

REMOVAL OF THE RIGHT SUPERIOR MAXILLARY BONE FOR A GIANT CELL SARCOMA. By Truman W. Brophy, M.D., D.D.S., LL.D., Chicago. I present to you this evening for your inspection, a patient upon whom I have operated for the removal of the right superior maxillary bone, which was involved in the development of a giant celled sarcoma. It is not my purpose to enter into detail on the pathology of the tumors of the oral cavity, but to present to you some of the clinical aspects of myeloid or giant celled sarcoma, the point at which it usually has its origin and outline, and a conservative method of treatment. The sarcomata are divided into four classes, spindle cell, round cell, myeloid or giant cell and melanotic. Of these the most benign are the giant celled growths. Not infrequently do these growths have origin in the antrum of Highmore, but the place of origin from which they most frequently develop is the sphenoidal fissure. Extending forward, the bone is often involved by the presence of these rapidly developing cells, which act as

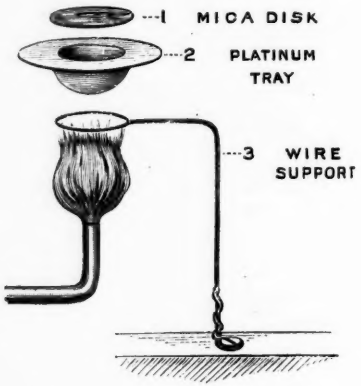
do osteoclasts and cause an absorption of the osseous structure. The structure of the giant celled sarcoma is made up of large multinucleated cells of embryonic connective tissue. As I remarked at the outset this is the least malignant of all the tumors of the sarcomatous group. Recognizing the pathology of these growths, familiar with their place of origin and the impression that they make upon surrounding tissues it may readily be seen that the tissues will be destroyed by contact with them as the growth increases in size. Usually from the point of origin the growth extends in the direction which affords the least resistance, which frequently leads to its extension forward. Ordinarily, if in the antrum it extends and fills the antrum and then as the nasal and distal walls are very thin, the growth involving these tissues finds its way into the nasal cavity, destroying the bony septum between the antrum and the nose, then coming in contact with the nasal septum effects its destruction until the entire nasal passage, the hard palate and the opposite maxillary bone may become involved and destroyed.

The appearance of the tumor is only occasionally preceded by pain. The pain which comes as the tumor develops is due more to its pressure upon surrounding parts. One of the first signs is the swelling of the face over the antrum, and subsequently a pressure or complete obstruction of the nose on the affected side. Later the whole nasal passage will be involved and obstruction attended with a discharge of bloody fluid. The growth may extend upward, involving the floor of the orbit and backward into the sphenomaxillary fossa. In the advanced stage the soft parts beneath the skin are destroyed and finally a breaking of the skin will leave a vast ulcer through which the fungous mass appears. Neighboring sinuses may be involved. The ethmoid cells, and often the base of the skull may be destroyed in the presence of these growths. The lymphatic glands rarely sympathize with this form of tumor. The destruction of life comes through the absorption of the bones from the base of the skull or by the general infection which it may bring on.

To treat a patient having a tumor of this character it is essential that the growth, together with the tissues involved, be thoroughly removed In all the works of surgical technique and prac-

tice it has almost invariably been taught and adopted in operating to make external incisions in the removal of this and other tumors within the mouth, nose and pharynx, especially this calling for the removal of the maxillary bones. While in certain cases it is extremely difficult to operate in the mouth, I am satisfied that in a large majority of such cases the patient may be saved unsightly scars by intraoral operations.—*Dental Review.*

A SIMPLE DEVICE FOR FUSING LOW HEAT PORCELAIN. By Dr. J. Allen Johnson, Middletown, Del. As many of our profession are located where the electric current is not



available, the use of gas or gasoline for the fusing of porcelain bodies becomes a necessity. It is for the special benefit of that portion of the dental profession that I will present a method whereby the use of low-fusing porcelain is simplified. In my own practice I only use the electric furnace for high-fusing bodies.

Using 1/1000 matrix platinum, conform it to approximate the form of a straw hat having a conical crown. The crown diameter equal to a No. 18 disk, with a depth of 3/8 inch. A mica disc of size sufficient to cover the crown opening completes the oven part of the device. A support is made of thin iron wire and attached to work bench.

The tray should be readily removable from the support. This

size of tray is large enough for any filling, and no investment need be used excepting for large contour fillings.

The mica disk excludes all gases from the blowpipe and, so far as I have observed, the results are equally as satisfactory as could be obtained with more elaborate outfits. The cost of construction is trifling, and good work may be done in less time than where the electric furnace is used.—*Items of Interest.*

PROPHYLAXIS IN MAXILLARY SINUSITIS.—As a broad basis for preventive work, I think we may formulate two conclusions: 1st—That if the predisposing constitutional or local conditions could be cured, the exciting or infectious forces would be nil. 2nd—Conversely, if the infectious forces could be neutralized the predisposing conditions would frequently not eventuate in disease, but still finally, always; for until a tissue that has gone wrong is made right, it has in it a degenerative nature, and time and further disease are synonyms. Hence the logic and science of prophylaxis, get the tissue right, get the environment right, get the life right.

This would be a very practical gospel, and exact science; but as this would mean the regeneration of society, as now constituted, we must in the meantime be content to practice those preventive measures which shall aim at these ideal conditions.

A brief summary of these measures, as suggested by study, would be:

1. The cooperation of dentists and rhinologists and the acquisition of such knowledge of each other's fields of practice as will at least enable them to diagnose the causal forces as they appear on either side of the antrum.

2. That every effort be put forth to recognize those causal conditions in their incipiency when they are yet single, or at least one-sided.

3. That the discovery of the incipient causal conditions means the discovery of the preinflammatory causal forces.

4. That these predisposing causes begin anywhere from in-utero to manhood; that in the inheritance of a weak or already proliferated lymph adenoid tissue, causing facial deformities, we have the most prolific basal cause of maxillary disease.

5. That the chief indication in the maintenance of the health of the antrum is the maintenance of free and normal ventilation.

6. That of the excitant causal forces infectious germs usher in those stages of antrum disease which we most frequently see, namely, the acute and chronic suppurative stages.

7. That the infectious germs would find little activity in a healthy soil.

8. So that finally the chief aim in the prophylaxis of chronic maxillary sinusitis should be the cure of the preinflammatory and predisposing causes.—A. R. SOLENBERGER, M. D., *Dental Brief.*

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Editorial.

DENTAL SURGEONS, THE ARMY MEDICAL CORPS AND RECENT LEGISLATION RELATING THERETO.

Quoted herewith is the text of an act calling for the reorganization of the corps of dental surgeons attached to the Medical Department of the Army, as passed by the Senate last month:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That to the Medical Department of the Army there shall be attached a corps of dental surgeons, which corps shall not exceed in number the actual requirements nor the proportion of one to one thousand authorized by law for service in the Regular Army, and all original appointments to said corps shall be made to the rank of first lieutenant.

Sec. 2. "That the appointees must be citizens of the United States, between twenty-two and thirty years of age, graduates of standard American dental colleges, of good moral character, and of unquestionable professional repute, and shall be required to pass the usual physical examination and a professional examination which shall include tests of skill in practical dentistry and of proficiency in the usual subjects in a standard dental college course: *Provided,* That dental surgeons attached to the Medical Department of the Army at the time of the passage of this Act may be eligible to appointment, three of them to the rank of captain and the others to the rank of first lieutenant, on the recommendation of the Surgeon-General, and subject to the usual physical and professional examinations herein prescribed: *Provided further,* That the professional examination may be waived in the case of dental surgeons whose efficiency reports and entrance examinations are satisfactory to the Surgeon-General; and the time served as dental surgeons under the Act of February second, nineteen hundred and one, shall be reckoned in computing the increase service pay of such as are appointed under this Act.

Sec. 3. "That the pay, allowances and promotions of dental surgeons shall be fixed and governed by the laws and regulations applicable to the medical corps; that their right to command shall be limited to the members of the dental corps; that their right to promotion shall be limited

to the rank of captain after five years' service and to the rank of major after ten years' service: *Provided,* That the number of majors shall not at any time exceed one-eighth nor the number of captains one-third the whole number in the said dental corps.

Sec. 4. "That the Surgeon-General of the Army is hereby authorized to organize a board of three examiners to conduct the professional examinations herein prescribed, one of whom shall be a surgeon in the Army, and two of whom shall be selected by the Surgeon-General from the contract dental surgeons eligible under the provisions of this Act to appointment to the dental corps.

Sec. 5. "That the annulment of contracts made with dental surgeons under the Act of February second, nineteen hundred and one, shall be so timed and ordered by the Surgeon-General that the whole number of contract and commissioned dental surgeons rendering service shall not at any time be reduced below thirty."

Passed the Senate January 29, 1908.

Attest: CHARLES G. BENNETT,
Secretary.

In submitting the above bill to the Senate at the first session of the 60th Congress, Mr. Bulkeley, from the Committee on Military Affairs, referred at length to the importance of the passage of the measure. The following quotations from reports of the various officers of the army, as strongly emphasized by Mr. Bulkeley, merit consideration in connection with this bill.

Surgeon-General Sternberg, in his indorsement of Senate Bill 5420, April 29, 1902, said:

"The dental surgeons appointed in accordance with the act of February 2, 1901, are rendering excellent service, and their services are highly appreciated by the officers and enlisted men of the army. A large number could be utilized to good advantage, and the permanent retention of dental surgeons as part of the military establishment will, in my opinion, be in the interest of the service. * * * I would suggest that the three dental examining surgeons be given the rank, pay and allowances of a captain of infantry, and the other dental surgeons the rank, pay and allowances of first lieutenant of infantry."

Colonel Maus, chief surgeon, says:

"It was almost impossible to realize the great benefit which resulted to the troops from this department, located, as they were, in the field. Engagements were made as in civil life, and both dentists were kept busy from early morning to late in the night. I was informed by the dentist that he was unable to attend to half of the calls that were made on him.

"In my opinion every corps should be provided with a dental department, consisting of one chief dentist with the rank of major, three dentists

with the rank of captain, and three assistant dentists with the rank of first lieutenant."

Dr. Fitzgerald, an old army surgeon, stationed at Camp Ramsey during the Spanish war, reports:

"At least half of the trouble from which our men are suffering comes from the teeth."

Later on he wrote, having had some experience with dental surgeons in the meantime:

"In the treatment of gunshot wounds of the jaw I found the use of a dental surgeon of great assistance, and believe that the service would be rendered more efficient by the addition to its staff of a corps of well-qualified dental surgeons."

Gen. Fred. D. Grant, in the Philippines, states the great importance of the work of the dental surgeons, and says:

"I believe that there should be three dental surgeons assigned to this department if possible, but not less than two under any circumstances."

Brig.-Gen. George M. Randall, from Luzon, in 1904, reports:

"There are not enough dental surgeons in the department for the work required. The recommendation for an increased number is approved. In this connection I invite attention to the excellent results obtained in the health and comfort of men from the work of dental surgeons, and it is recommended that they be given permanent positions and commissioned rank in the Medical Department."

Col. George F. Chase, commanding the Twelfth Cavalry in the Philippines in 1904, reports and recommends the establishment of a corps of dental surgeons, with commissioned officers as members, and further:

"I am convinced that a trained commissioned corps of dental surgeons would be a great improvement upon the present system, and would be an economical measure."

Again, in May, 1904, Col. Marion P. Maus reports, after showing the great importance of the work of dental surgeons:

"I strongly urge legislation making a permanent corps of dental surgeons in number suited to the demands of the service, with permanent rank and pay."

The report of Surgeon-General O'Reilly, on the lines of whose recommendation this bill was drawn, and of the General Staff commend the service of the dental corps as "superior services, eminently satisfactory, and highly efficient."

After a careful and unbiased reading of the Act as recommended by the Committee on Military Affairs, together with the opinions

of the officers of the army, who are in a position to appreciate the true service rendered by dental surgeons since their appointment, it will readily be seen that it is the plain duty of the profession, individually and collectively, to use all honorable means at their command to interest their Congressmen in the passage of this bill. To this end the attention of the readers of the DIGEST is especially directed.

Obituary.

HARVEY EDGAR HARRISON, M.D., D.D.S.

During the past few weeks, the dental profession of Chicago, and particularly the Alumni of Northwestern University Dental School, have been called upon to mourn the death of Dr. Harvey E. Harrison. He died January 23, 1908, after an illness of but a few days. He attended the clinic of Northwestern University Dental School January 14, and at the business meeting was reelected President of the Alumni Association by an almost unanimous vote. The following day, although somewhat indisposed, he attended the clinic of the Chicago College of Dental Surgery and gave the demonstration of extracting he had promised. After this he rapidly grew worse and typhoid pneumonia resulted, which caused his death.

The funeral was held at the home in Irving Park, Sunday afternoon, January 26th, and the remains were deposited in a vault in Rosehill cemetery, to be removed later to Warrensburg, Missouri, where Dr. Harrison was born in the year 1867. A large number of friends attended the funeral and sent beautiful floral pieces.

Dr. Harrison attended Northwestern University Dental School and received the degree of Doctor of Dental Surgery in 1899, after which he entered the general practice of dentistry in Chicago. He became especially interested in extracting and took charge of the extracting clinic at Northwestern during the school year of 1903-1904. Since that date he has been specializing as an extractor of teeth, his practice growing so rapidly that it was soon necessary for him to enlarge his offices and increase his facilities.

For some time past Dr. Harrison has been recognized as an expert

operator and one of the best extractors, but he was so enthusiastic about his work and untiring in his efforts to become still more efficient in his specialty, that he took a four years' course in medicine at an evening school, receiving the degree of Doctor of Medicine about June 1, 1907. Even this did not satisfy him and he began a course of post-graduate study in medicine.

He was an active member in the Chicago-Odontographic, Englewood and Illinois State Dental Societies and belonged to the Psi Omega Fraternity. He was President of the Alumni Association of his alma mater, a willing worker in all of its affairs and contributed a number of worthy articles to the dental journals.

Dr. Harrison was so energetic and thoroughly absorbed in his professional, society, literary and alumni duties, combined with medical studies, that he so far forgot the frailties of human nature that when the final illness fell upon him he had little strength with which to resist. He is survived by his wife and little son, Harvey Edgar, Junior, three years of age.

His life was one of marked activity and energy, his genial personality and skilful technique won for him many friends and patients and his death marks the end of a most useful career.

CHARLES R. BAKER, D.D.S.

February 10, 1908.

Notices.

TEXAS STATE DENTAL ASSOCIATION.

The next annual meeting of the Texas State Dental Association will be held at Dallas, June 11, 12 and 13, 1908. Visitors from other states cordially invited to attend.

J. G. FIFE, Secretary,
Dallas, Texas.

MASSACHUSETTS BOARD OF REGISTRATION IN DENTISTRY.

A meeting of the Massachusetts Board of Registration in Dentistry for the examination of candidates will be held in Boston, Mass., March 4, 5, 6, 1908.

All applications, together with the fee of twenty dollars, if first examination, must be filed with the secretary of the board on or before February 26, as no application for this meeting will be honored after that date.

Every candidate for examination must be twenty-one years of age. Application blanks may be obtained from the secretary. Temporary licenses

are never granted. The fee for third and subsequent examinations is $5.

G. E. MITCHELL, D.D.S., Secretary,
25 Merrimack St., Haverhill, Mass.

NORTHERN INDIANA DENTAL SOCIETY.

The twentieth annual meeting of the Northern Indiana Dental Society will be held at Fort Wayne, Ind., September 8 and 9, 1908. An excellent meeting is expected.

J. A. DINWIDDIE, Secretary,
Lowell, Ind.

MANITOBA (CANADA) DENTAL ASSOCIATION.

The biennial meeting of the Manitoba Dental Association was held at Winnipeg, Jan. 13, 1908, and the following officers were elected: President, G. F. Bush, Winnipeg; Secretary, C. H. Walsh, Winnipeg; Treasurer, K. C. Campbell, Winnipeg; Registrar, H. A. Croll, Souris.

BLACK HILLS (S. D.) DENTAL ASSOCIATION.

At the annual meeting of the Black Hills Dental Association, held at Rapid City, Jan. 4, 1908, the following officers were elected: President, F. M. Gantz, Deadwood; Vice-President, L. E. Eaton, Hot Springs; Secretary, A. L. Revell, Lead; Treasurer, G. E. LeMar, Rapid City.

ROCK ISLAND COUNTY (ILL.) DENTAL SOCIETY.

At the annual meeting of the Rock Island County Dental Society, held at Moline, Jan. 21, 1908, the following officers were elected: President, J. W. Gluesing, Moline; Vice-President, William Carl, Rock Island; Secretary, A. H. McCandless, Rock Island; Treasurer, John T. Taylor, Rock Island.

SOUTHERN WISCONSIN DENTAL ASSOCIATION.

The Southern Wisconsin Dental Association will hold its fourteenth annual meeting at Platteville, May 27 and 28, 1908. An excellent meeting is assured.

C. W. COLLVER, Secretary,
Drake Bldg., Clinton, Wis.

MISSOURI STATE BOARD OF DENTAL EXAMINERS.

The State Board of Dental Examiners for Missouri will meet in the Hall of Representatives in Jefferson City, May 25, 1908, beginning at 2:30 p. m. Applicants should come with instruments and material for both prosthetic and operative work, except vulcanizer. A diploma from a reputable college or a certificate from another board is essential to examination. The fee is $10.

S. C. A. RUBEY, Secretary,
Clinton, Mo.

SHEBOYGAN COUNTY (WIS.) DENTAL SOCIETY.

At the first annual meeting of the Sheboygan County Dental Society, held at Sheboygan, Jan. 20, 1908, the following officers were elected: President, J. S. Danforth, Sheboygan; 1st Vice-President, R. W. Robertson, Plymouth; 2d Vice-President, E. A. Dean, Sheboygan; Secretary-Treasurer, W. G. Hollingsworth, Sheboygan.

SOUTHEASTERN IOWA DENTAL SOCIETY.

The annual meeting of the Southeastern Iowa Dental Society was held at Ottumwa, Ia., Jan. 14, 1908, and the following officers were elected: President, W. W. Vance, Ottumwa; Vice-President, T. S. Cooke, Burlington; Secretary, George W. Slingluff, Burlington; Treasurer, W. E. Creath, Ottumwa. The next meeting will be held at Oskaloosa.

ODONTOTECHNIQUE SOCIETY OF NEW JERSEY.

The regular monthly meeting and banquet of the Odontotechnique Society of New Jersey will be held Thursday evening, March 5, at the Elks' Club, 37 Greene St., Newark, N. J.

The paper of the evening will be read by D. A. Webb, M.D., of Scranton on the subject of "Malignant Growths of the Jaw, Fractures, etc."

Stereopticon views will be used to illustrate the lecture.

JOHN A. VOORHEES.
Journal Correspondent,
Newark, N. J.

ALUMNI ASSOCIATION OF THE ST. LOUIS DENTAL COLLEGE.

The Alumni Association of the St. Louis Dental College will hold their annual clinic at the college building, Grand and Caroline St., Tuesday and Wednesday, May 19 and 20, 1908.

A good program is being arranged and all graduates of the college are respectfully requested to be present and aid in making this meeting a success.

W. M. COLLINS, St. Louis,
T. F. FLEMING, St. Louis,
Committee on Publicity.

MARYLAND STATE DENTAL ASSOCIATION.

The thirteenth annual union meeting of the Maryland State Dental Association and the District of Columbia Dental Society will be held in Baltimore, Md., June 4, 5 and 6, 1908, at the Dental Department of the University of Maryland.

Special effort will be exerted to make this meeting a great success. Clinics will be given and important papers read by eminent members of

the profession, and a cordial invitation is extended to all ethical practitioners to attend and take part in the proceedings.

F. F. DREW, Cor. Secy.,
701 N. Howard St., Baltimore, Md.

VERMONT STATE DENTAL SOCIETY.

The thirty-second annual meeting of the Vermont State Dental Society will be held at Hotel Pavilion, Montpelier, Vt., May 20, 21 and 22, 1908.

Preparations are being made for an excellent program, and members of the dental profession are cordially invited.

C. H. KENT, President,
Barre, Vt.
THOMAS MOUND, Secretary,
Rutland, Vt.

MISSOURI STATE DENTAL ASSOCIATION.

The forty-third annual meeting of the Missouri State Dental Association will convene in St. Louis, June 1, 2, 3, 1908, at the Planters' Hotel. Rates, $1.50 and up, per day. Efforts are being made to make this the most successful meeting in the history of the association. Distinguished members of the profession from other states will be present. All ethical members of the profession are cordially invited to attend.

J. W. HULL, Pres., Kansas City, Mo.
E. P. DAMERON, Cor. Sec., St. Louis, Mo.

NORTHERN OHIO DENTAL ASSOCIATION.

The fifty-first annual meeting of The Northern Ohio Dental Association will be held at Canton, Ohio, May 26, 27, 28, 1908.

The sessions will be held in the city's auditorium, one of the largest in the middle West, with headquarters at the Courtland Hotel. There are numerous other hotels in Canton, so there will be accommodations for all. Hotel rates may be had at from $1.50 to $5 per day, American plan.

Canton is essentially a dental manufacturing town, having three large and busy plants. The exhibits will be first class.

The committees are sparing no time nor expense to make this an especially attractive meeting. The program will be up to the standard of previous years. Men of international reputation have been secured to read papers and give clinics.

Remember the time and place, May 26, 27, 28, 1908, Canton, Ohio.

W. H. WHITSLAR,
J. H. WIBLE,
F. M. CASTO, *Chairman,*
Executive Committee.

SEVENTH DISTRICT DENTAL SOCIETY OF THE STATE OF NEW YORK.

The fortieth annual meeting of the Seventh District Dental Society of the State of New York will be held at the Powers Hotel, Rochester, N. Y., Tuesday and Wednesday, March 31 and April 1, 1908. It is expected that this will be one of the best meetings in the history of the society. The second day will be devoted to clinics; this will be an eminently practical meeting. The latest and best in dentistry will be in evidence. Inlay methods and appliances will be a feature. There will also be an exhibition by manufacturers of dental materials.

CLINT W. LASALLE, *Secretary*,
708 University Ave., Rochester, N. Y.

WM. W. BELCHER
B. S. HERT
W. W. SMITH
} Business Committee.

CENTRAL DENTAL ASSOCIATION OF NORTHERN NEW JERSEY.

The annual meeting of the Central Dental Association of Northern New Jersey was held January 20, 1908, at Davis' Parlors, Newark, N. J.

The annual election of officers resulted as follows: President, C. F. Alfred Hane, D.D.S., Jersey City; Vice-President, R. C. Fowler, D.D.S., Harrison; Secretary, Edwin W. Harlan, D.D.S., 56 Madison Ave., Jersey City; Treasurer, Charles A. Meeker, D.D.S., 29 Fulton St., Newark; *Executive Committee*, S. C. G. Watkins, D.D.S., Montclair; M. R. Brinkman, D.D.S., Hackensack; Dr. Frederick W. Stevens, Newark; Dr. Oscar Adelberg, Elizabeth; D. G. Farrington, D.D.S., Caldwell.

The executive committee has the promise of several very interesting papers from prominent members of the profession for the coming season.

The annual banquet will be held on Monday, February 17, at the Knickerbocker Hotel, New York. A good time is assured all who attend, for the chairman of the Dinner Committee, Dr. Wm. L. Fish, has been working overtime to make this banquet surpass all preceding banquets of the association.

EDWIN W. HARLAN, Secretary,
Jersey City, N. J.

LATEST DENTAL PATENTS.

874,379. Dental crown driver, Clarence R. Averill, Webster, N. Y.
874,489. Dental pliers, Gilbert J. Clark, Mayville, Wis.
875,885. Barbers' chair, E. Berninghaus, Cincinnati, Ohio.
875,992. Dental tool, H. A. Gollobin, Newark, N. J.
876,043. Tooth crown, T. A. Davis, Warsaw, Ill.
876,526. Dental extractor, O. Cholinsky, Prague, Austria-Hungary.
876,842. Dental tool, L. S. Robinson, Alameda, Cal.

News Summary.

JOHN R. WHITE, a dentist of Uplands, Cal., died January 17, 1908.

HENRY A. SMITH, a dentist of Adams, Mass., died January 14, 1908.

LUDWIG H. BERG, a pioneer dentist of Salt Lake City, died January 17, 1908.

J. P. FOLTZ, 83 years old, a retired dentist of Mendota, Ill., died January 8, 1908.

GEORGE P. MANN, a well-known dentist of San Antonio, Tex., died January 26, 1908.

DR. RITCHIE, formerly a dentist of Salt Lake City, died at Los Angeles, Cal., in January.

C. M. CALVERT, 57 years old, a well-known surgeon-dentist of Eau Claire, Wis., died January 21, 1908.

THOMAS E. JAXON, 40 years old, a dentist of Alliance, O., died from pneumonia, January 21, 1908.

E. J. GREENE, a pioneer resident and one of the best-known dentists of Peoria, died February 4, 1908.

ALBERT COWEE, a prominent dentist of Hartford, Conn., died from spinal meningitis, December 25, 1907.

G. A. FOSTER, 48 years old, for twenty-five years a dentist of New Albany, O., died January 23, 1908.

JOHN BROWN, for several years dentist of the Veteran's Home, Los Angeles, Cal., died January 22, 1908.

JAMES I. RICHARDSON, 50 years old, for fourteen years a dentist of Kansas City, Mo., died January 15, 1908.

C. F. KING, one of the best known of the younger dentists of Cincinnati, died from pneumonia, January 7, 1908.

J. S. DEWEY, 45 years old, a well-known dentist of Alturas, Cal., died at Roseburg, Ore., from pneumonia, January 11, 1908.

H. E. MACDONALD, 49 years old, for twelve years a practicing dentist of Chicago, died from pneumonia, February 2, 1908.

R. P. WELCH, a dentist of Waynesboro, Pa., died from concussion of the brain, as a result of injuries received from falling from a car, January 14, 1908.

CHARLES F. MATTESON, a dentist, practicing in Chicago from 1876 to 1898, died at the residence of his brother, Dr. Arthur E. Matteson, February 2, 1908. Dr. Matteson was a life member of the Illinois Dental Society and was at one time president of the Chicago Dental Society.

HARVEY E. HARRISON, 39 years old, a specialist in anesthesia and the extraction of teeth, died in Chicago from typhoid pneumonia, January 23, 1908. Dr. Harrison was president of the Northwestern Alumni Association, a mem-

ber of the Illinois State Dental Society and the Chicago Odontographic Society.

FAYETTE HERRICK, 74 years old, one of the oldest practicing dentists in western Pennsylvania, died at Greenville, January 23, 1908.

THOMAS FILLEBROWN, 72 years old, one of the best-known men in dental and medical circles, a specialist in the surgical operation upon cleft palate, and for many years professor of operative dentistry and oral surgery at the Harvard Dental School, died in Boston, January 27, 1908.

DENTAL EDITOR MARRIED.—Dr. Geo. W. Cook of Chicago, editor of *American Dental Journal* and dean of the dental department of the University of Illinois, was recently married to Mrs. Margaret Irons of Hebron, Ind. Dr. Cook's many friends join with the DIGEST in extending to him and Mrs. Cook their heartiest congratulations.

A TEST.—The brigands threatened to pull the teeth of their prisoner.

"Go ahead," he told them, calmly; "but I won't know whether you are real brigands or not until you present the bill."—*Philadelphia Ledger.*

DOING HIS BEST.—Patient—"What would you think of a warm climate for me?"

Doctor—"That's just what I'm trying to save you from."—*Denver Catholic Register.*

PLATINUM INDUSTRY.—The platinum industry in British Columbia is making good progress. Not long ago a French company acquired considerable land in the platinum district, and is having this territory carefully examined by experts. Other companies have also secured ground, which is to be exploited in a more practical manner than has hitherto been the case.—*British Dental Jour.*

FINISHING AMALGAM FILLINGS IN INTERPROXIMAL SPACES.—After removing the matrix band, draw back and forth against the filling a moistened strip of rubber dam as you would sandpaper in finishing gold fillings. Do this before the amalgam has set thoroughly, and you will have an excellent cervical margin and a surface that will need no further polishing. If the rubber is stretched, no metal will overhang the margin.—M. E. PHELPS, D.D.S., *Dental Summary.*

CORRECT?—A teacher in a public school asked the children to define the word "advice."

"Advice," said a little girl, "is when other people want you to do the way they do."—*Christian Register.*

TO OBTUND SENSITIVE DENTIN.—Flood the cavity with pure phenol and wait a minute or so; then put into the cavity a little finely powdered sodium dioxid without wiping out the phenol. This first application causes some pain. Add a few more grains and commence to carefully excavate. If the rubber dam be not used, care must be taken of the gum, as the sodium dioxid is an efficient caustic.—HENRY I. MOORE, *Dental Review.*

[This is a dangerous method, as phenol and sodium dioxid are chemi-

cally incompatible, and a pyrotechnic display is likely to result. Sodium dioxid should never be used in the mouth without the rubber dam.—EDITOR DENTAL DIGEST.]

THE MARBLE HEART.—The miserly millionaire suffered from pains in his chest.

"I wish it was true," he said to his doctor, "that surgery could replace a bad heart by a sound one. Do you think that will ever be possible?"

"Hardly," responded the doctor, who disliked fool questions from the laity, "but in your case it would be a job for the stonecutter, anyhow."—*Philadelphia Ledger.*

DIATORIC TEETH IN PLATE WORK.—Pass a piece of 24-gauge iridiumoid wire through hole in tooth, giving it one twist and cut off, having ends long enough to form a small loop, bending each end of the wire forward toward body of tooth; the loops take the place of pins, with no fear of pulling from the plate, and the piece can be finished as artistically as any vulcanite denture.—C. W. MYER, *Dental Summary.*

DENTISTRY IN THE ENGLISH ARMY.—The relation of good teeth to good health is emphasized by a recent action in the English army whereby bad teeth shall not be a bar to reenlistment. Hereafter the soldiers will be compelled by a military rule to march to the dentist periodically. England has found that she cannot afford to lose good soldiers because of bad teeth. She will insist upon regular use of brush and pick and will pay dentists' bills.—*Pacific Dental Gazette.*

TO MAKE CEMENT ADHERE TO ENAMEL.—Sometimes, when the surface of enamel nearest the gum becomes exceedingly sensitive, the surest way of relieving it is to flow some cement over it and let it remain till it wears off. To make the cement stick to the smooth surface of the enamel, smear some of the liquid of the cement over the sensitive area and let it remain a few minutes before adapting the cement. The material will not then flake off.—*British Dental Journal.*

FIRES.—Dr. J. C. Bragdon, Augusta, Me., Jan. 18; loss, $300.—Dr. H. S. Moser, Boonville, Mo., Jan. 20; loss, $1,000, insurance $900.—Dr. Jesse Miller, Maryville, Mo., Jan. 18; loss, $1,000.—Dr. J. F. James, Moro, Ore., Jan. 23; loss unknown.—Dr. S. B. Cook, Chattanooga, Tenn., Jan. 20; loss, $2,500, insurance, $800.—Drs. Briggs of Oconto, Wis., T. R. McCoy of Waterloo, Ia., Nicholson of Sandusky, O., and Randall of Truro, N. S., were also losers by fire in January.

PARTIAL DENTURES: CLASPS.—Clasps should be accurately fitted to the broadest part of the tooth, which is near the masticating surface of the crown, and never allowed to go near the neck of the tooth; they should not be allowed to impinge upon the gums, which would cause recession of that tissue and exposure of the cementum. Acute pericementitis is liable to result from pressure of clasps at the neck of the tooth.—A. O. MORENO, *Pennsylvania Dental Journal.*

BE CAREFUIL WITH YOUR COTTON USED IN TREATMENT OF ROOTS.—While so many are very careful that the cotton they use is absolutely sterile, yet others leave the holder, with the cotton, on the bracket table after the day's work, and the janitor's broom and duster will cause an entire metamorphosis on the second day this cotton is used in treating root canals, etc. We always insist on being supplied by the druggist with a particular kind, manufactured under perfect aseptic conditions, but we abandon the great rule of asepsis by leaving the cotton on the table after the day's work! The proper thing to do is to place the cotton in the cabinet before anything else is done, and keep it there until needed.—BERNARD BRAMM, *Dental Review.*

ADMINISTERING GAS.—It is not necessary to diet before the administration of gas. The position of the patient is of the greatest importance, and in operating the head should be well erect, so that tooth substances or blood clots do not get into the throat, and thereby cause strangulation. In regard to requesting patients to loosen their clothes, I find it is not necessary unless the patient feels uncomfortable, in which case the collar may be loosened.—A. B. ALLEN, D.D.S., *Dental Review.*

THE HORN MALLET.—The horn mallet as it is placed on the market is practically useless and no effort is made to show the dental students what the remedy is. The long-pointed end can be used for no purpose. The other end is too large to be useful. To remedy the defect, saw off the long end where it is three-quarters of an inch in diameter and round the edges with a rubber file. Then it can be used over the palatal surface and along the margins.—L. P. HASKELL, *Dental Review.*

SETTING INLAYS.—An inlay when finished should accurately fit the cavity, and though it does so before being cemented, yet after it is set we find at times projecting margins. This is due to an excess of cement, or a too rapid setting. I try the inlay to be certain of its fit, then bur out a slight portion of the dentin, taking care not to touch the margins. I find by doing this that I have a more perfect adjustment; of course in extremely sensitive cavities this procedure is not followed.—*Western Dental Journal.*

FRATERNALISM DESTROYS SELFISHNESS.—A man may use fraternalism to advance his selfish ends, but while selfishness possesses him, true fraternalism will know him not. The time prior to the days of dental societies and dental fraternities was before the days of dental progress. When dentists began to organize for mutual help, professional growth began. In the olden days when an ingenious man invented or discovered a new method or remedy he carefully guarded it, locked his laboratory or kept it to himself. When he joined a fraternity he brought the experiences and inventions to this common exchange, and soon found that he took away more than he brought, and that he could not afford to stay away unto himself. The basic principle of human ethics lies in the fact that every man is debtor to the world. He owes the world; no matter how good or great he may be, still he is debtor to the world. It has given him more than he has given it. This also becomes the true basic principle

of professional ethics. Every man is debtor to his profession; no matter how great he may be, he has got more than he has given. So, therefore, if a man become a fraternal man, he will also become an ethical man. Fraternity, then, is the key which unlocked the door of progress, and selfishness was the lock. Fraternity is the only key that will fit or unlock it.—E. J. PERRY, D.D.S., *Xi-Psi-Phi Quarterly.*

ARTICULATION OF FULL DENTURES.—The correct articulation of the teeth is a mechanical problem, and its comprehension involves the understanding of the movements of the mandible, and the anatomic peculiarities of its articulation with the temporal bones. And as these joints are complicated in their construction, the mandible having more free movements than does any other bone in the body, a careful study of the anatomy of the parts is required for a clear comprehension of this part of the subject.—GEORGE B. SNOW, *Dentist's Magazine.*

PHYSICIANS AND DENTISTS ORGANIZE.—Omaha physicians and dentists are organizing a mutual protection association, the chief object being to provide each member with a reliable credit guide compiled from the names of delinquents furnished by the members of both the medical and dental professions in the city. This is for the purpose of shutting out "dead beats." All persons whose names are so reported to the association will be required to pay cash for medical and dental services until such time as they are reported as having settled back accounts.—*Omaha World-Herald.*

TO REMOVE FROM THE SKIN BLACK STAINS CAUSED BY SILVER NITRATE.—Black stains on the skin, caused by silver nitrate, in stick or solution, may be whitened, and their removal much expedited, by the application of a solution made according to the following formula:

℞ Hydrargyri chloridi cor.,
Ammonii chloridi, aa gr.x
Aquæ, fʒjss — M

Sig.—Apply to stains on the skin, with friction.—*Canadian Journal of Medicine and Surgery.*

EXTRACTION OF ABSCESSED TOOTH.—There is no more reason why an abscessed tooth should be retained in the jaw simply because the face is swollen than there would be to allow a splinter of wood to remain in the hand, a piece of glass in the foot, or a piece of steel in the eye, until the inflammatory symptoms have subsided, before attempting to remove it, since the forms of pathology are identical. DR. E. C. KIRK, *Items of Interest.*

[The pathologic manifestations may be identical, but the comparisons are not at all analogous. The extraction of an abscessed tooth in the acute stage often spreads the infection and causes severe trouble. EDITOR DENTAL DIGEST.]

ACCIDENTS.—Dr. B. W. Trask of Rumford Falls, Me., was severely burned by the explosion of an alcohol lamp, which he was using while filling a

tooth for a patient, Jan. 14.—Dr. Arthur Enders of Benton Harbor, Mich., suffered a painful and perhaps dangerous wound, when, in attending a patient, Jan. 14, an instrument came in contact with his hand in such a manner as to injure it severely.—Dr. A. P. Herron of Indianapolis narrowly escaped injury by the explosion of a vulcanizer in his office, Jan. 11. A patient who was entering at the time was almost stunned by the shock and considerable damage was done to the dentist's property.

IMPROVEMENTS IN ANESTHETICS.—Commenting on reports of the success in Paris of Professor Leduc's "natural" anesthesia, induced by the application of intermittent electric currents to the head, which is said to be quite without danger to life, inducing no functional disturbance of heart, lungs, or any other organ or mechanism, a writer in *The Medical Times* (New York, January) says:

"Such claims as these have been made—and quite recently—for other newly discovered anesthetics; yet in routine surgical practice lumbar puncture, the scopolamine method, the use of magnesium salts, and the like seem all to have been discarded. They have not in fact induced a state of unconsciousness sufficiently profound for satisfactory major work. It should, moreover, be borne in mind that the surgeon requires not only unconsciousness sufficient to permit the use of the knife; there must also be complete relaxation of the muscles and tissues and a measurable assurance that an operation once begun shall be carried on to undisturbed completeness. And in these regards nothing has quite taken the place of ether and chloroform.

"Claim has been made for the newer anesthetics that they are much safer than the old. But an absolutely safe anesthetic is a contradiction in terms. The little experience we have had of the newer methods has abundantly shown them to be by no means entirely safe.

"An anesthetic which will induce insensibility sufficiently deep for satisfactory surgery must in the nature of things stand for some danger; anyone profoundly anesthetized is always very near the border-line between life and death. This all physicians understand, and that is why we are ourselves, of all people, the greatest cowards and the most unwilling to undergo operation. The reason why the patient so rarely goes beyond the border-line lies not so much in the agent employed as in the skill of the experienced anesthetist, who knows the properties of the drug he uses, who, after a thorough examination, has taken all precautions, who foresees all possible 'accidents,' who will not trust to luck, and who remains vigilant throughout and until the return to consciousness.

"It is certainly most desirable that search will be continued for an anesthetic safer than any we now possess; but it is probable that in most cases we shall find no better method than to begin with nitrous oxid—the initial shock due to fright, which is probably the most prolific cause of disaster from an anesthetic, is thus best avoided—and from this gradually by the use of a suitable apparatus to go on to ether. An enter-

prising and astute colleague has invented a method, by which, to begin with, an odor of delicious perfume is generated for women and of an aromatic cocktail for men. The mortality from the old methods is indeed extremely small. 'Ether and chloroform rank very high among the most precious gifts of science to humanity; it is they which have made modern surgery possible.' "—*Literary Digest.*

APPLICATION OF THE INLAY.—In cases where the teeth have become loosened by the ravages of pyorrhea or by mechanical injuries an excellent use can be made of gold inlays. Two or more teeth can be held firmly in place by an appliance made of two or more inlays soldered together and cemented in place. In cases where two teeth have become separated, allowing a space for food to lodge and cause an inflammatory and diseased condition of the tissues, which, as we all so well know, is the source of a great deal of trouble, this can be corrected very satisfactorily by the use of two gold inlays, set mesiodistally and united or soldered at the occlusal angle, thereby retaining the two teeth in place, preventing the space from becoming larger, and closing it from any further wedging of food.—E. M. S. FERNANDEZ, *Dental Review.*

MARRIAGES.—H. B. Rodgers, a dentist of Watsonville, Cal., was married to Miss Anna Beith, also of Watsonville, Jan. 19.—R. D. Moran, a dentist of Kewanee, Ill., was married to Miss Emily Dunn of Brookfield, Jan. 6.—K. W. Houston, a dentist of St. Louis, Mo., was married to Miss Alpha McEldowney, also of St. Louis, Dec. 26.—LeRoy Wade Rodgers, a dentist of Shenandoah, Ia., was married to Miss Grace Padmore of Marshalltown, Jan. 7.—Roy E. Wood, a dentist of Fairbury, Neb., was married to Miss Margaret O. Kerr of the same place, Jan. 16.—C. L. Glenn, a dentist of Marissa, Mo., was married to Miss Anna Waggoner, also of Marissa, early in January.—A. B. Stewart, a dentist of Bowling Green, Ky., was married to Miss Elizabeth Mayberry of Nashville, Tenn., Jan. 22.—John P. Lamb, a dentist of Johnson City, Tenn., was married to Miss Elsie Hickman, also of Johnson City, Jan. 17.

THE MENTALITY OF PHYSICIANS.—The city physician is a man of the world, a society man, golf-player, etc., like other men of his standing. The mentality of physicians, however, offers a special type, as all bear the imprint of the same education. One of the speakers, M. de Tarde, drew a comparison between the mind of the physician and of the lawyer. The former, he said, believes in external and immutable truth, while the lawyer admits only an internal and variable truth, that is, psychologic truth. Accustomed to the relative truth of ideas, to controversial reasoning, the lawyer is ready to discuss and argue, while the physician, looking up to absolute and external truth, yields to facts, without discussing them. In commenting on this the *Semaine Medicale* states that submission to facts is not the essential feature of the scientific mind. The facts must be correlated, interpreted, and correct deductions drawn. And herein is the weak point of the medical education of the day. Untrained in philosophic

reasoning, physicians are often inclined to confound more or less hasty generalizations with the facts themselves, and blindly accept both.

The time is past when encyclopedic knowledge is attainable by any one individual, but even making allowances for the unavoidable necessities of specialization, it is still true what Liard wrote fifteen years ago: "Specialization is becoming more and more of a necessity nowadays. It imposes the necessity for opening before the young mind—before the hour of the inevitable specialization—the whole broad field of science if the individual is to be anything more than a mere machine. The young mind realizes better the dignity of the special work, which it takes up later if it comprehends the relation it bears to the whole and to general knowledge."—*Jour. Amer. Med. Assn.*

ILLEGAL PRACTITIONERS.—Through the detective work of four young women dental students of San Francisco, seven men accused of practicing without licenses have been arrested and must face charges in the police courts. The arrest of the dentists is the result of a crusade against the practicing of dentistry by men who have not passed the required examinations.—A dentist of Sioux Falls, S. D., recently fined $100 and sentenced to a term of twenty days in the county jail, the jail portion of the sentence being conditional upon the good behavior of the defendant, has again been arrested on the charge of practicing dentistry without a license.—A dentist of Toronto, Ont., has been arrested on two charges of practicing dentistry without a license. A fine of $20 and costs on each charge was imposed.

THE D.D.S. DEGREE IN GERMANY.—We are informed through a reliable source that by a recent decision of the Supreme Court of the German Empire (Reichsgericht) the regulation heretofore enforced forbidding the public use upon signs or otherwise of the American title "Doctor of Dental Surgery," or its abbreviation, D.D.S., has been abrogated, and that henceforth a general permit is granted to American dentists, graduates of reputable colleges, to use their title of Doctor of Dental Surgery publicly and without interference upon the part of the authorities.

The decision above referred to permits qualified holders of the American degree to use their title in English as "Doctor of Dental Surgery" or "Dr. of Dental Surgery," but these are prohibited from using the German designation "Americanischer Zahnarzt."—EDITORIAL, *Dental Cosmos.*

GOVERNOR DENEEN SIGNS COCAIN BILL.—A great aid to the police in dealing with drug fiends is promised in a bill signed yesterday by Governor Deneen prohibiting the sale of cocain or other narcotics except on the prescription of a physician. The bill was championed by reform organizations of the city, and by its heavy penalties for violations is expected to materially restrict the growing use of drugs, especially in Chicago. "I believe the new law will be of great assistance to us," said Inspector Revere of the Desplaines street district, where much of the cocain abuse has flourished. "We have been unable under the old law to prosecute persons selling adulterated cocain if they called it by another name. Whenever we have

caught a dealer he has claimed he has been selling eucain, and the statutes do not prohibit its sale. Specialists say it has a large amount of cocain in it and produces the same effects as does cocain if taken in sufficient quantities."—*Chicago Record-Herald.*

FOOLISHNESS.—

Who's to blame if you by worry
Fill each waking hour with dread?
Does the fault belong to others?
Isn't it your own instead?

Here's a sunny plain and cheery,
There's a valley dark and damp;
It's for you to choose between them.
Where will be your daily camp?

Might as well be bright and smiling,
All depends upon your mind;
Might as well enjoy the melon
As to only eat the rind.—*Exchange.*

DENTAL PARLORS: HOW TO GET RID OF THEM.—Dr. Franklin W. Barrows, in *The Dietetic and Hygienic Gazette,* although not writing upon a dental subject, incidentally throws out a suggestion that is well worth considering by those of our profession who have much to say against the "Dental Parlors." He says: "A mechanic, who asked him to engage a nurse for his wife, remarked, 'When our first baby came I was earning $10 a week and paying a trained nurse $20 a week. A fellow can't keep up that sort of thing very long at a time. Guess you'll have to send around a cut-price nurse this time, doctor.'" The doctor did, and did so without attributing to that family any unreasonable prejudice against trained nurses. Some day the trained and overtrained nurses will profit by their long competition with the cheap nurse. They will see society as she sees it—as the social worker sees it. They will devise means to supply the poor and those of moderate incomes with the best of nursing at the lowest of prices. And then the undertrained nurse will begin to go to school, or go out of business.—*Dental Brief.*

ROBBERIES.—Burglars entered the offices of Drs. H. H. Johnson, W. L. Smith, A. M. Jackson and Holmes Mason of Macon, Ga., Jan. 10, and took gold foil valued at $200.—Drs. Wm. McL. Bethea and R. L. Henry of Augusta, Ga., were robbed of gold, valued at $75, and a completed bridge, early in January.—Dr. I. B. Carolus, Mt. Sterling, Ill., gold fillings valued at $15.80, Feb. 1.—Drs. L. G. Powell, H. A. Fisher and J. T. Holmes of Wabash, Ind., lost gold valued at $100, Jan. 27.—Dr. Frank Adams' office, Elkhart, Ind., was burglarized of $70 worth of gold, Jan. 27.—Dr. C. M. McDowell, also of Elkhart, lost gold valued at $25, Jan. 22.—A skeleton key was used to enter the office of Dr. E. D. Slawson, Bay City, Mich.,

while he was at lunch Jan. 31, and gold valued at $30 and $10 in cash taken, seventy-five dollars' worth of gold and platinum being overlooked.—A glass showcase fastened to the outside of the building and belonging to Drs. Lee & Turley, Duluth, Minn., and which contained about $100 worth of gold, molds, teeth, etc., was broken open and contents taken, Jan. 15.—Dr. H. R. Bristol, Bennington, Vt., was relieved of gold valued at $100, Jan. 4.—About $28 worth of gold was taken from the office of Dr. Houston, Mansfield, O., the latter part of January.—Two fashionably dressed women entered the office of Dr. George F. Logan of Philadelphia, Jan. 23, under the pretense of having their teeth examined, and came out loaded down with about $500 worth of Mrs. Logan's jewelry. Of course, Dr. Logan was unsuspicious when the two women, strangers to him, entered his office on the second floor of his home and asked in the gentlest tones if he could examine their teeth "right away." One waited while the other sat in the dental chair and insisted that Dr. Logan make a careful search for cavities. It was an easy piece of work, for he found but one defect. Evidently the woman thought that he was finishing entirely too quickly, for she urged that he "take another look." As soon as she had decided that there was but one tooth that needed to be filled the women left with the excuse of returning the next day. Later in the day Mrs. Logan went to her room around the hallway from the office and found that her jewelry was missing.

THE STEAM DRILL AND THE TOOTH.—A MODERN FABLE.—During the reign of Theodore, the Bear, there lived a mechanic by the name of Judd. Now Judd had a fine steam drill; and he had a tooth.

"Mighty little use you are to my Master," said the Drill to the Tooth. "For a fortnight now, he has been cussing a blue streak; and he winds up every sentence with, 'Damn that tooth!'"

Here the poor Tooth tried to get in a word; but his feeble voice was drowned in the clanging syllables of the Drill. "You and your whole palefaced tribe of dandies are but poor pretenders at best. If I were one-half as worthless as you, I'd die in my shame."

"That's what I'm doing," broke in the poor Tooth. "I think that you are rather unjust in your denunciations of me. Now, I have noticed," continued the Tooth, "not without pangs of jealousy, I must admit, what fine treatment you have ever received at the hands of our Master. When he is done with you, how finely you are groomed, and packed carefully away in oil, which you so truly love. But it is far different with me. I am never given sufficient time to properly do the work for which nature has fitted me. But, worse than that, I am kept wallowing clear to my ears in a flood of the juice of tobacco."

Here the poor Tooth paused to catch his breath; and he shook and jumped as if in mortal agony. This seemed to strike the swell Drill dumb. Then, after a while, the Tooth said, rather sadly, "I have tried as hard as you to serve our Master well; but he has made a very common mistake in supposing that I would always hold up, even in the presence of

the most abominable environment and treatment. In other words, our Master has thought that I was immune from wear and tear."

"I would not stand such treatment," said the Drill, with a tone full of repentance for its late harangue. But the poor Tooth had fallen into another fit of pain, and was jumping like a mad mule, all the while being roundly cussed by his foolish Master. But the agonies must have dulled the poor Tooth's ears, so that the cuss words were lost.

Moral: Treat a tooth right, and it will not get sore and jump, and cause profanity.—E. CLAIR.

EXAMINING BOARD AFFAIRS.—The Indiana State Board of Dental Examiners has arranged a reciprocal agreement with a number of states for interchange of licenses. Besides Indiana the agreement embraces four states, Minnesota, Michigan, Iowa and New Jersey. Negotiations are now on with a number of other states. The agreement provides that if an Indiana dentist of not less than five years' practice wishes to locate in one of the other states he may do so without being compelled to take any examination in the state in which he locates, except that embracing practical work. To get a recommendation from the Indiana board the dentist must be a reputable ethical practitioner.—Gov. Cummins of Iowa has reappointed Dr. F. H. Rule of Ackley as a member of the State Dental Board. The appointment is for five years.—A bill has been presented to the Massachusetts senate to abolish the State Boards of Registration in Dentistry, Medicine, Veterinary Medicine, Pharmacy and Embalming, and to put their duties upon a new officer to be called a registrar, and upon the secretary of the State Board of Health.—A bill extending reciprocity in dental certificates to states honoring certificates to Ohio graduates, also prohibiting any member of the State Board of Dental Examiners from serving more than two terms, passed the Ohio legislature Jan. 20.—The report of the Board of Dental Examiners of Ohio shows that during the year 1907 there were 104 certificates to practice the profession issued, of which 91 were on examination. A total of 4,166 certificates has been issued since the organization of the board, May 31, 1892.—A bill has been introduced in the house of the Oklahoma legislature limiting the practice of dentistry in Oklahoma, and similar in its nature to a bill now in the house relating to the practice of medicine. The bill provides for the creation of an examination board of five members to be appointed by the governor, the board to serve a term of five years. It will be unlawful for any dentist to practice without first taking an examination, the fee for the quiz to be $25. The penalty for violating any provision of the act is a fine of from $25 to $100. Each dentist in the state must renew his license yearly at a cost of $1.—C. F. Kuster has sued the State Board of Dental Examiners of Washington for $2,165 for refusal to grant him a license to practice dental surgery in that state.—A receiver has been appointed for the Washington State Board of Dental Examiners upon the application of Samuel R. Stern of Spokane, who alleges that the board owes him $1,400 for legal

services, which he is unable to collect. The application for the receivership order was not resisted by the dental board at the hearing recently.

THE USE AND ABUSE OF THE TOOTH BRUSH.—It is without question a fact that in a majority of instances the teeth of individuals are not kept sufficiently cleansed. The modern methods of food preparation do away with the necessity for much mastication, and the teeth and gums lacking this functional use require something to take its place in order to maintain a normal condition in the mouth. If the surfaces of the teeth were constantly wiped clean by the friction of food in mastication, and the gums stimulated to normal function by usage, there would be less dental caries and fewer diseases of the pericemental membrane and gums. But lacking this there arises the necessity for supplying this friction by the tooth brush. Of the utility of this process there can be no doubt, provided always that the brush is used judiciously, but unfortunately, like many another worthy thing, it is frequently abused. Much injury is often done the gum tissue by too vigorous cross brushing—the bristles forcing the thin gum away from the teeth and leaving the surface exposed at the junction of the enamel and cementum.

The gums and teeth will stand a great deal of friction and be benefited by it if it is exerted in the right way, and it should be the duty of the dentist to so instruct his patient that the brush may be used judiciously. To merely insist on the patient brushing the teeth thoroughly, and emphasize this fact at every sitting, is to take the chances of doing more harm than good by inducing the patient to cross-saw the teeth more and more with the disastrous results already indicated.

Nor will it do to tell the patient to "brush the teeth up and down" as is so often done. This is as likely to work injury as the cross brushing by forcing the gums away from the upper teeth on the upward stroke of the brush and from the lower teeth on the downward stroke. In fact it is quite an art to properly brush the teeth. The brush should be made to rotate against the surfaces of the teeth, coming in contact with the gums and teeth of the upper jaw only on the downward stroke, and vice versa. There should of course be some cross brushing against certain surfaces and positions in the mouth where the rotary method cannot well be employed, but the patient's attention should be especially directed to the danger of injury to the gums by too much cross brushing at the point where the free margin of the gum covers the tooth. This evil is growing rapidly among those who are ultra particular regarding the care of the teeth, and it requires constant observation and supervision on the part of the dentist to check it. The practice of dentistry is one continuous campaign of supervision and education, and apparently when one evil is corrected another one crops up to take its place. Some individuals today are doing more harm than good with the tooth brush, but this is no argument against the judicious use of the brush.—EDITORIAL, *Dental Review.*